Privacy Unit Readies Recommendations to Congress

By Edith Holmes
Of the CW Staff

ASHINGTON, D.C. — The Privacy Protec- Study Commission will recommend that gress establish an executive branch "board" elp federal agencies implement the Privacy of 1974 as well as any future law passed for ate-sector recordkeeping.

owever, at a meeting here last week, the com- ion voted not to give that "privacy entity" regulatory authority.

for use of the Social Security number (SSN), commission members agreed to "temper" its in the public sector and "study" its use in the ate sector — this after considerable dispute.

ese two decisions will become part of the mission's report to Congress and the President due on June 10. However, a July completion of the report appeared more likely last week.

The privacy board, proposed by Rep. Edward I. Koch (D-N.Y.), would monitor and evaluate efforts to implement present and future privacy statutes, according to a commission spokesman.

Such a board would also continue the research function of the present Privacy Commission. For example, the board might well look into the use of the SSN by the private sector, according to commission chairman David F. Linowes.

Another issue meriting further study is the "transborder, transnational data flow" of multinational companies, he noted.

Additional issues, such as the privacy aspects of taking and keeping criminal histories and of telecommunications as a whole, deserve in-depth study, the spokesman said.

While the board would not issue regulations to the federal agencies, it might help the executive branch interpret the 1974 Privacy Act.

An authoritative agency has yet to provide such rules, the spokesman noted. The Office of Management and Budget (OMB) issued general guidelines for implementing the privacy law and various agencies created their own specific rules, but there has never been one all-purpose guide, he explained.

Finally, the commission decided the board would advise Congress, the President, federal agencies and, upon request, states regarding the privacy implications of proposed federal and state activities, the spokesman noted.

For example, Secretary Joseph A. Califano's plan to reorganize the Department of Health, Education and Welfare (HEW) could result in the combination of once-separate recordkeeping systems, the spokesman suggested. The proposed board might assist an agency like HEW in assess-

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NEWSPAPER

IBM's Nicholas deB. Katzenbach (left) and Calcomp's Maxwell C. Blecher, although courtroom foes, agreed the antitrust laws are a mess in Senate hearings last week.

U.S. vs. IBM Shows Shambles Of Antitrust Law, Senate Told

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — The system for bringing large antitrust cases to trial has fallen apart, particularly in the Southern District Court of New York where the federal government's antitrust case against IBM is currently being tried.

That was one point of agreement to come out of hearings before the Senate Antitrust and Monopoly Subcommittee here last week.

In the shambles that is U.S. vs. IBM, senators and attorneys representing both plaintiffs and defendants in antitrust cases concluded that judges need to take "firm control" of such cases.

Attorneys ranging from Maxwell C. Blecher, the Los Angeles attorney who represents California Computer Products, Inc. in its antitrust action against IBM, to Nicholas deB. Katzenbach, general counsel for IBM, look to the bench as one key to minimizing delays in such cases.

The hearings, which served largely to introduce Sen. Edward M. Kennedy (D-Mass.), the new subcommittee chairman, to the complexities of antitrust, turned into a debate on the state of antitrust. The debate ranged from contentions that enforcement of the laws is "alive and well" to pronouncements that it is a "monumental failure."

Blecher said Kennedy and his subcommittee need only look at the markets for telephone equipment and general-purpose computer systems to know that one firm dominates each of these fields.

Oligopoly is with us to stay, "the antitrust laws have been a monumental failure," the West Coast attorney contended.

The antitrust laws would best be used today as civil rights laws, designed to permit those small and medium-sized companies that have been "victimized" to seek and re-

(Continued on Page 4)

IBM Enhances DOS/VS With Update, Program Aid

By Don Leavitt
Of the CW Staff

WHITE PLAINS, N.Y. — IBM continued its move toward unbundled operating systems with the introduction of Release 34 of DOS/VS and an Advanced Functions-DOS/VS program product here last week.

Release 34, scheduled for delivery late this month, includes only minor enhancements over previous releases, but "significant new functions" are provided — for $200/mo — with the Advanced Functions-DOS/VS program product announced at the same time.

While those functions may be "significant" for IBM, many of the features found in the Advanced Functions program have been available for years from independent software firms.

The announcement followed IBM's pattern of unbundling operating systems software that started last March when IBM introduced the $1,250/mo MVS System Extensions program product for sophisticated installations and reinforced it with the introduction of the System Support Program for $85/mo with the System/34 [CW, April 18].

The capabilities of the Advanced Functions package could have been included in the DOS/VS release; IBM admitted as much when it said Release 34 is a prerequisite to the Advanced Functions software.

Device Support Extended

Release 34 is marked primarily by support for more devices than were covered under prior releases. This includes, for example, support for IBM 3330-11 and 3350 direct access storage devices, for the 3277 as an operator console and for the 3450 as an IPI communication device, IBM said.

The Advanced Functions package incorporates an enhanced linkage between DOS/VS and IBM's Virtual Machine Facility (VM/370) under which processing is said to be both smoother and faster than before.

Other support provided by the separately priced package includes six- or seven-partition operation, dynamic partition balancing, asynchronous operator communications and a faster linkage editor than IBM has supplied previously, a spokesman said.

The net effect of this particular packaging, in the view of one observer, is that "IBM has finally unbundled certain aspects of systems programming" for the DOS/VS environment.

While the features and functions provided by Release 34 and the Advanced Functions package are new in IBM's repertoire, many of the capabilities have been available for years in packages developed and sold by independent software houses.

Typically these packages were introduced as enhancements to DOS/360 when IBM announced it had "functionally stabilized" that operating environment with Release 26 in early 1972. But a growing number of the packages have been converted to DOS/VS as that user base has grown.

When the Advanced Functions package is

(Continued on Page 2)

Univac Jumps on Bandwagon Of Mainframers Cutting Prices

By Esther Surden
Of the CW Staff

BLUE BELL, Pa. — Univac is joining the ranks of mainframers making price cuts in the wake of recent IBM reductions.

Effective May 16, the company will lower prices on selected configurations of the Univac 1100/10, a product said to span the performance range of the IBM 370/138 to the 148, the 90/60, also in the 370/138 range, and the smaller 90/30, 90/30B and 90/25 systems that can be compared to the IBM 370/115.

The firm is also reducing by 30% the cost of memory expansion in 524,000-byte increments for 90/60 users who purchase over 1M byte, according to a spokesman.

In addition, Univac announced several configuration packages for the 90/60 and 1100/10 systems said to provide price breaks for users.

Lease prices for two previously configured 1100/10 systems were reduced between 4% and 7% while purchase prices were cut about 5%, the spokesman said.

An 1100/10 CPU with 196K words of memory in one cabinet, console, four I/O channels, disk controller and one spindle of Model 8434 disk formerly cost $487,860 to purchase but now costs $463,500. It leased for $8,150/mo and now leases for $7,700.

A configuration with 262K words of memory in two cabinets with memory overlap, four I/O channels, console and one spindle of disk that cost $576,360 to

(Continued on Page 2)

Most CPUs, Disk Drives

IBM Admits Reduced Gear 'Not in New'

By Molly Upton
Of the CW Staff

ARMONK, N.Y. — IBM's recent price reductions are looking more and more like an old-fashioned clearance sale when one considers that many of the items sporting reduced price tags are no longer in new production.

Within three weeks, IBM effectively lowered prices on the 3330 series of disk drives [CW, April 11] as well as on the 370 series of mainframes [CW, April 4, 18].

Among the CPUs no longer in new production in the 370 series are the 115, 125, 135, 145, 155 and 165 as well as the 158 and 168, as originally announced.

A spokesman confirmed the 3330, 3330-11 and 3333 disk drives are also no longer in new production. Their prices were cut without much advance notice to the public.

IBM heralded its price cuts on main memory, but many of the CPUs affected by this change are not in new production either.

IBM classifies its production status in three ways: "new production," "limited new production" and "not in new production."

"Limited new production" means machines are still being newly manufactured, but orders may be filled with returned machines warranted as equal to new in performance, the spokesman explained.

Similarly, orders filled for units "not in new production" are returned, refurbished machines. These, too, are warranted as new. IBM declined to divulge information pertaining to shipment rates on various units.

The newer version of the 158, the 158-III, which includes a larger buffer, is in new production, but production on the 168-III is considered "limited new."

The upgrade units for the 135 and 145 that convert them into the 135-III and 145-III are "in new production," he said. The upgrades were announced at the same time as the 138 and 148.

The 138 and 148 and the recently announced 3033 are "in new production."

Although prices have not been reduced on some peripherals, the spokesman indicated some are also not being newly made. For example, the 3420 tape drive and the 3803 controller are in limited new production, he said.

The 3340-B1 disk drive, one of the "Winchester" family, is not in new production; however, the 3340-A2 and B2 as well as the 3344 and 3350 are in new production," he noted.

IBM Extends DOS/VS Functions

(Continued from Page 1)

in place, DOS/VS supports six partitions if system residence is on IBM 3340 or 3344 disks. DOS/VS supports seven partitions if the system is resident on any other direct access storage device, except the 2311 or 2321, IBM said.

Six-partition support has been available under The Computer Software Co.'s Extended DOS (Edos) ever since it was introduced years ago. Twelve-partition support is available under DOS/MFT from Software Pursuits, according to that firm.

"Partition balancing" describes changes in workload assignments made "on the fly" by the system after internal monitoring makes it clear the original jobstream status is inefficient.

Dynamic balancing of this type has been part of Edos and the sole purpose of products such as Lihra from Datachron and EQULPRTY from Lahyrinth Systems.

Asynchronous operator communication provided by the Advanced Functions package allows an operator to defer responding to a console message, even to the point of answering later messages before the one on which he has deferred. The selectivity provided by this feature allows the operator to tend to high priority work regardless of when messages are received, IBM noted.

Coupled with the 3277 display operator console facility in Release 34, this appears to be similar to the capability of the Display Operator Console Support (Docs) package from CFS, Inc.

The faster link editor facility is intended to speed up the program development cycle. This, too, has been recognized as a problem by the independent vendors, which have responded with packages such as Fleet from Software Design, Inc. and Flee from Goal Systems.

The private library device independence provided by IBM's Advanced Functions package is like the support provided by various "source library" maintenance packages.

The enhanced linkage between VM/370 and DOS/VS is said to be primarily aimed at reducing CPU busy time. The facility is available as a generation option; it avoids the execution of redundant functions in DOS/VS, deferring instead to use of VM/370 logic when it applies, IBM indicated.

Univac Joins IBM, Cuts Prices

(Continued from Page 1)

purchase now costs $547,600. It leased for $9,600/mo and now leases for $9,200.

Two 1100/10 configurations never before available were also announced. One includes a CPU with 262K words of memory in one cabinet with memory overlap, four I/O channels, system console and one spindle of disk for $527,520 or $8,800/mo.

The other, with 524K in two cabinets with memory overlap and two spindles of disk, costs $810,000 or $13,500/mo.

The newly configured 90/60 allows main storage of 1M byte of memory. It includes a CPU, 1M byte of memory, two selector channels, one byte channel and a console.

This configuration would have cost $425,700 previously; it now costs $411,600. It would have leased for $10,040/mo and now leases for $9,673.

This will result in a reduction of 3% to 7% in the overall lease or purchase price of a typical 90/60 system compared with the former prices, the company stated.

Univac also cut the price of the 90/25, 90/30B and 90/30 processors, memory and peripheral devices by about 10%. With the cut, a system with 98,000 bytes of main memory, storage protection, micrologic expansion, integrated disk adapter, two 8418-94 disk drives, a card reader, punch, printer, print cartridge and print position expansion feature now costs $188,784 compared with $209,760 previously.

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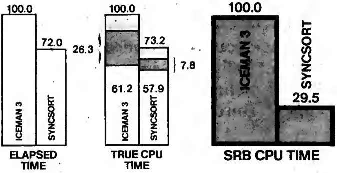
It is one of those historic moments in the Annals of Sort! The very first appearance in competition of IBM's new SM1-5740, Release 3, in the tough-as-nails MVS League. Will the kid be able to live up to his advance press notices?

Confidently ICEMAN 3 strides to the plate . . . knocks the dirt out of his spikes . . , hitches up his britches.

Then, as sorting fans everywhere gasp in amazement, he lifts his arm lazily and points toward the centerfield flagpole, thousands of bytes away. The kid is going to try to emulate Babe's mighty homerun shot!
Moments later, SyncSort winds up . . . a curving white blur is seen . . . and . . . and . . .

There is no joy in Armonk! ICEMAN 3 struck out every time it came to bat against the latest release of SyncSort III-and-a-half in a recent series of MVS benchmark tests. (In sorting, as in most other forms of human endeavor, it's a long way from *baby* to *Babe*.)

The bar charts below tell the story more eloquently than we can:



SyncSort will simply sort at considerably lower expenditure of computer resources than Release 3. That didn't surprise us too much, since we make it a point to stay a couple of years ahead of the Computer Giant.

But what really caused up to swallow our chaw was the amount of "Locked-up" SRB CPU Time in ICEMAN 3. SRB CPU Time is, of course, that portion of the True CPU Time which is uninterruptible. It directly affects the performance of other jobs in a multi-programming environment. The more SRB CPU Time a job uses, the more difficult it is for the CPU to accomplish its job of multi-programming.

In ICEMAN 3, SRB CPU Time amounts to a whopping 26.4% of the total. With SyncSort you can reduce that "locked-up" time by 70.5%!

We just thought you'd like to know that the rookie has a weakness for missing signals.

Of course, everything we've said about ICEMAN 3's performance applies to MVS. We'll soon be providing you with a form sheet on how the kid does in VS1, SVS, OS —

Hold it! Did we say OS? And you thought IBM wasn't supporting OS anymore?

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IBM Memory Bundling Killed Off Competitors: Andreini

By Catherine Arnst
Of the CW Staff

NEW YORK — "IBM, given its financial strength, political power, immense resources and its position as one of the most powerful companies in the world, can at any time put any company competing against it out of business," the most recent witness in the U.S. vs. IBM antitrust trial charged.

By bundling the main memory under the cover of some of its CPUs, IBM caused the number of competitors in the add-on memory market to drop from a high of 18 firms in 1972 to only four "significant" manufacturers today, Richard C. Andreini, vice-president of marketing for Intersil, Inc. (formerly Advanced Memory Systems, Inc. [AMS]) testified here recently.

The drastic reduction of competitive firms "points to a basic instability in the industry," and that instability is a result of the vulnerability of plug-compatible memory manufacturers to IBM's control of that market, Andreini stated.

The price cuts IBM has made on main memory since 1972, particularly the most recent reduction made last month [CW, April 18], were "not justified," "without reason" and aimed at stopping competition, he charged.

"During the 1960s, IBM never reduced the prices of memory" because it faced no competition in that area, he said. IBM maintained the same prices on its memory for the System 360 from 1964 through 1970 even though manufacturing costs were dropping, an internal IBM document stated [CW, Feb. 14].

"This high price umbrella with margins in some cases of nearly 50% combined with the core memory technology which was understood by others in the industry" led to the start of competition in the add-on memory market in 1970, according to George Dole, attorney for the government.

AMS's expertise was in the semiconductor area and it offered MOS semiconductor add-on memory rather than the ferrite core memory IBM was using when it entered the market.

AMS and other memory manufacturers were successfully developing add-on memories for all the models in the 360 series and the 370/155 and 165, announced in June 1970, Andreini said.

Four-Year Cycle

Historically, IBM obsoleted its equipment after a four-year cycle in the marketplace, Andreini said. However, on Aug. 2, 1972, IBM obsoleted both the 155 and 165 — two years after their introduction — with the announcement of the 370/158 and 168.

Each of these systems contained one-half megabyte of main memory under the cover of the CPU included in its total price, thus precluding competitors from offering add-on memory for those systems.

The price of any incremental memory purchased for these products was reduced by IBM by 93% from the 165 (priced at $1.6 million) to the 158 (priced at $110,000), Andreini said. The prices of the corresponding CPUs were raised by almost 100% to offset the decreases in memory price, he said.

This bundling action by IBM foreclosed AMS from approximately $9 million in revenue, but IBM protected approximately $275 million in revenue on its 158 and 168, Andreini estimated.

There was "no technological reason" for bundling that one-half megabyte, he claimed. "It was an effort by IBM to prevent add-on memory companies from entering the market," he said.

Another Blow

IBM struck another blow to the add-on memory manufacturers with the announcement of its 370/145 Model 2 in 1973, Andreini said. That redesign did not offer any improvements in performance, but it did allow IBM to cut the price of main memory to a point too low for its competitors to successfully compete, he said.

AMS had to redesign its plug-compatible add-on memory for the Model 2 at a cost of $1.5 million.

Shortly after the announcement of the 370/145 Model 2, Cambridge Memories, Inc. went from 400 employees to 50; the Model 1 had been its most successful product, Andreini said.

Further damage was done to AMS by IBM in 1971 when IBM refused to provide maintenance on its systems that had AMS memory attached, he said.

AMS and Itel Corp., which marketed its products to end-users, took IBM to court. In March 1972, a stipulated verdict was handed down directing IBM to use its "best efforts" to maintain those systems.

IBM customers with memory had to receive approval letters stating the system tested successfully with the attachment in order to receive IBM maintenance.

Itel began writing a clause into its leasing contracts allowing lessors not to pay monthly charges until that letter was received.

Andreini said he wanted the letter within 30 days of an installation, but 50% of those accounts requiring one took longer than that, and the average length of time after an installation that a letter was received was 90 to 120 days, he said. These delays are still occurring.

IBM traditionally did not cut its prices on its 370 CPUs along with lowering the memory prices until its April announcement when it cut the prices on the 370/135 and 145 CPUs by 20% and the main memory by another 35%, Andreini said.

IBM has become unpredictable in its actions toward the memory firms and there is "relative uncertainty" about any future actions it might take, Andreini charged. "Each subsequent action has been more severe. We face the future with a great deal of concern," he added.

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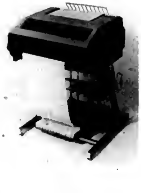

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U.S. vs. IBM Handling Attacked At Hearings on Antitrust Laws

(Continued from Page 1)

ceive redress for large companies' conduct, Blecher said.

Large cases like U.S. vs. IBM are "brought down for two reasons," he noted. "We fail to understand the schizophrenic response of the courts who try to separate the 'good' from the 'bad' monopolists" on the basis of social and political issues unrelated to the legal decision at hand.

In addition, "judges have failed to take charge of antitrust cases," Blecher stated.

The antitrust lawyer cited the case against IBM, on trial for nearly two years in New York City, as a case in point. Calling U.S. vs. IBM "a disgrace," Blecher contended Judge David N. Edelstein is primarily responsible for the slow pace of the proceeding.

Private Lawyers Urged

The Justice Department's inability "to retain enough talented recruits to develop a stable of experienced trial lawyers capable of withstanding the onslaught of the premier law firms financed with 'the-sky-is-the-limit' budgets" sparked another Blecher recommendation.

He proposed the government be permitted to go outside and hire private practice lawyers experienced in big cases.

"The 'big case' has not just become unmanageable; it has become a menace to the system, threatening to bring disgrace upon the bar and judiciary alike," Blecher said.

'Alive and Well'

In his testimony before the Senate subcommittee, Ira M. Millstein, an antitrust lawyer from New York, disagreed with Blecher by saying he believes antitrust is "alive and well."

Even Millstein said, however, that "in 1977, antitrust is playing to a full house with nothing much happening."

The New York attorney also said he could come up with "no defense" for the current status of U.S. vs. IBM.

The problem in the computer industry case as well as in other massive antitrust suits is that "nobody really knows what these cases are about or what they are designed to achieve," Millstein said.

He, too, put the responsibility for defining the direction of these suits at the doors of the judges who hear them. The judges in these cases should call the parties in on the day the complaint by one against the other is filed, Millstein told the senators.

The government should be forced to sit down and state what it wants to prove and how it intends to prove it. The defense, in answer to the government, should be made to do the same, the attorney argued.

The judge can then determine just how much discovery — what documents need to be exchanged and how many witnesses are to be deposed — is to be done, Millstein said.

The downfall of the large antitrust case comes when "discovery runs itself," he suggested. The judge must take "firm control."

For Katzenbach of IBM and Harold S. Levy of AT&T, antitrust is sufficiently "alive" to provide their firms with more government and private cases than they want to handle.

Predicting that a Supreme Court decision in U.S. vs. IBM is as far as 10 years away, Katzenbach said he believes government actions should preempt similar private suits, whether brought before or after a government case.

Katzenbach would like to see Congress abolish awards of treble damages to a private claimant where that company's case is based on facts and claims similar to those in a pending government case. Because of what Blecher called antitrust "emotionalism," Katzenbach also contended the jury trial in a private antitrust action should be abolished.

"We ought to . . . stop pretending that a jury of 12 randomly selected citizens can decide any issue of market structure or national economic policy," he said.

As far as public antitrust cases brought by the government are concerned, the situation "is worse than this committee imagines," Katzenbach said, referring to the present state of U.S. vs. IBM.

There is no reason why a large antitrust case should take more than three to three and one half years in the district court, Katzenbach asserted.

The Justice Department "should seriously consider employment of private practitioners to be lead counsel in complex cases," Katzenbach said.

But Donald I. Baker, departing Assistant Attorney General for the Antitrust Division, disagreed. Hiring outside counsel for jobs like these would "demoralize" Justice Department staff attorneys, he said.

On the AT&T case, Levy said the Justice Department's antitrust suit against AT&T represents the government's "overzealous application of the theory of competition" without an appropriate dose of common sense.

Appalled that "enormous effort is to be expended in a judicial proceeding intended to restructure one of the few industries that works," Levy said Congress should reassert its authority over the structure of American industry.

Say Unit Can't Function Without CPU

Trade Groups, IBM Ask Detariff of Dataspeed 40/4

By Molly Upton
Of the CW Staff

NEW YORK — Two industry associations and IBM have filed briefs in the U.S. Second Circuit Court of Appeals seeking a reversal of the ruling by the Federal Communications Commission (FCC) that allowed AT&T to tariff its Dataspeed 40/4 on an interstate basis [CW; Dec. 6, 1976].

The crux of the issue is the FCC's finding that the Dataspeed 40/4 is not a DP device and thus could be tariffed along with Bell's other communications offerings.

Filings against the FCC ruling have been made by the Computer & Communications Industry Association (CCIA) and the Computer and Business Equipment Manufacturers Association (Cbema) in addition to IBM.

AT&T and the U.S. Independent Telephone Association are expected to file their briefs today, when the FCC will respond. The FCC previously obtained a two-week extension on the filing date.

The CCIA filing asks the court to reverse the FCC order and remand it for a full hearing while the IBM filing seeks a reversal of the commission's order with directions to reject the Dataspeed 40/4 tariff as unlawful.

The Dataspeed 40/4 has been the subject of controversy almost since its inception. The FCC finding that resulted in tariffing the 40/4 overturned a ruling by the chief of the Common Carrier Bureau.

DP or Not DP

The petitioners contend the Dataspeed 40/4 is a DP device. The CCIA argues the unit cannot function without attachment to a CPU. Both the CCIA and IBM maintain it is irrelevant whether the unit is local or remote; it has the same capabilities.

IBM cited AT&T marketing documents to prove the device was intended to compete with its 3270 and other DP devices. The firm also pointed out the FCC ruling was inconsistent with the First Computer Inquiry's rules that prohibit Bell and other common carriers from offering DP services except through arm's-length affiliates.

The Cbema brief focused on the violation of the Computer Inquiry rules which forbid cross-subsidization, the practice of using earnings in one area to cut prices in another.

In its filing against the FCC, the CCIA charged the agency's action "represents an unjustified departure from existing commission rules of procedure, is plainly erroneous, is inconsistent with existing commission regulations and is in derogation of provisions of the Communications Act of 1934."

The FCC found the Dataspeed 40/4 "does not come within the scope of Section 64.702 because the original Computer Inquiry, from which that section evolved, addressed only those DP functions performed by a central computer and 'did not address the question of DP elements being removed from the central computer,' " the CCIA brief stated.

"However, neither the history of the Computer Inquiry nor a reasoned interpretation of the commission's rules supports such as conclusion," the CCIA continued.

"Moreover, it stands as patently illogical that the commission's expressed regulatory concerns could have been intended to pertain only to carrier-provided DP services involving central computer, but not to carrier-provided DP involving a component equipment such as I/O data terminals and other system devices, especially when the underlying justification for such concerns are identical, i.e., the impairment of competition and possible adverse effects on common carrier services," the CCIA said.

IBM also focused on the lack of difference in function between local and remote terminals. "When [storage, retrieval, merging, sorting and calculating capabilities] are performed by a device that is physically in the same 'machine' as the CPU, or is in the same room as the CPU and is connected to it by ordinary cables, no one would question that the device is DP equipment performing DP services; and no one would suggest that such a device could conceivably be deemed a communications facility," IBM said.

FCC Description

The CCIA observed that the description of DP as adopted by the FCC computer rules included an overall functioning of several component devices that perform the input, processing and output activities on data for a given user.

However, the FCC's interpretation that the rules only cover the central computer contradicted Section 64.702(d) which specifically includes system component offerings by carriers, the brief remarked.

Same Functioning

"Since the Dataspeed 40/4 would function no differently to the user in either mode [connected via cable or phone lines], it is patently erroneous for the commission to assume that by merely increasing distance between the CPU and the terminal the characteristics of this device suddenly change from a component part of a central computer into a communications device," the CCIA charged.

"In similar cases of rule construction, courts have held that where a rule is subject to differing interpretations, an agency's failure to evaluate the conflicting policies which weigh on either side of the issue gives cause for a reviewing court to vacate that agency's order."

IBM pointed out the inconsistency between the FCC's ruling and Computer Inquiry I and the lack of explanation for this: "Administrative agencies may reverse policy only with reasoned explanation therefor," IBM remarked.

Rather than looking at the functions performed by the Dataspeed 40/4 without regard to its dependent interactive relationship with a CPU, the FCC should have adopted the test proposed in the second Computer Inquiry, IBM said.

That test is "whether the operations of the whole system of which a device is an integral part are DP activities. But under either test, the Dataspeed 40/4 is a DP offering not subject to commission tariff," IBM concluded.

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Privacy Group Readies Report

(Continued from Page 1)

ing what the privacy implications of reorganization would be.

The board would be "a rallying point for privacy matters," Linowes said — "a place where privacy grievances can be heard and through which these complaints could be redressed," the spokesman added.

Limits on SSN

The commission's decisions regarding the SSN indicate the body wanted to limit any increased use of the identifier where privacy safeguards were lacking. At the same time, none of the commissioners wanted to curtail the positive role the number could play as part of a program like the potential national health insurance system or as a solution to a present problem such as identifying illegal aliens in the U.S.

Adopting a motion put forward by Rep. Barry Goldwater Jr. (R-Calif.), the commissioners agreed to recommend the retention of Section 7 of the 1974 Privacy Act that requires federal agencies to cite the authority by which they compel a citizen to provide his SSN. This section also guarantees the citizen will receive the benefit or service for which he is applying even if he does not give his number to the agency.

The commission also agreed that the federal government should not take any action that would foster the development of a standard universal label or a population register — at least not until steps have been taken concerning the commission's many recommendations.

End to Roosevelt Order

Further, the effect of Executive Order 9397, a 1943 directive issued by President Franklin Delano Roosevelt, should be negated, according to the commissioners. The order, which states that any federal agency establishing a uniform system of account numbers must use the SSN, was not meant to be used in the identification of people, they maintained.

However, the commission found this order is among the most often cited authorities used by agencies to compel citizens to divulge their SSNs.

By "whisking away Executive Order 9397," Congress would provide itself with an opportunity to examine any new agency system hoping to use SSN as a record identifier, commissioner Willis Ware noted.

This treatment of federal agencies would "transmit a strong message to the private sector" to tie requests for the number to fair recordkeeping practices, the commission agreed.

Califano Signs Rule Forbidding Job Bias Against Handicapped

WASHINGTON, D.C.— A regulation in the 1973 Rehabilitation Act that among other things forbids discriminating against the handicapped in employment was signed into law April 28 by the Secretary of Health, Education and Welfare (HEW).

The regulation states that employers cannot refuse to hire a handicapped person if his handicap does not impair his ability to do the job and if "reasonable accommodations" can be made to the handicap.

The law, destined to impact many businesses in the U.S., will "open a new era of civil rights in America," HEW Secretary Joseph A. Califano Jr. said on signing the regulation.

The Rehabilitation Act [CW, April 4] also requires any contractor or subcontractor doing more than $2,500 in business with the federal government to have an Affirmative Action program for the handicapped.

Further, it states that any facility built after June 1 must be barrier-free and readily usable by the handicapped.

One of the Rehabilitation Act's effects was to expand the definition of handicapped to include diabetics, epileptics, those with cancer in remission, drug addicts and alcoholics.

The inclusion of drug addicts and alcoholics has raised a great deal of controversy. Califano was reportedly considering deleting them from the regulation until an opinion from Attorney General Griffin Bell upheld the act's definition of handicapped.

Califano emphasized, however, that the regulation applies only to "discrimination against qualified handicapped persons solely by reason of their handicap." This means an alcoholic or drug addict could be refused employment based on a record of past absenteeism, dangerous behavior or unsatisfactory work performance.

Conference Set

NEW YORK — The Second National Conference on Compliance with Legislation Concerning the Handicapped will be held at the United Nations Plaza Hotel here June 8-9.

The conference will be particularly timely in view of the recent action of the Secretary of Health, Education and Welfare regarding industry's stance with regard to the handicapped.

Topics to be discussed include job accommodation modifications, interviewing techniques, methods of selling Affirmative Action to labor unions and procedures for recruiting handicapped workers.

Further information is available from Information Science, Inc., 95 Chestnut Ridge Road, Montvale, N.J. 07645.

A handicap was defined as a "physical or mental impairment," such as blindness, deafness or mental illness, which substantially limits one or more activities. It also includes anyone who is regarded as having such an impairment or has a record of such an impairment. The regulation goes into effect May 28.

Court Dismisses EDS Protest

NEW YORK — An appeals court here last week dismissed a protest filed by Electronic Data Systems Corp. (EDS) against F&M Schaefer Brewing Co., tossing a dispute over a multimillion-dollar system back for a jury decision when a lawsuit filed by the beermaker against EDS goes to trial in November.

In doing so, the Second Circuit Court of Appeals upheld the ruling made in March by Federal District Court Judge Constance Baker Motley [CW, March 21]. Motley ruled the brewer could not keep the facilities management system developed under a contract with EDS until the trial unless it paid $1.3 million to EDS. Schaefer made the payment.

The dispute over the system began when Schaefer, unhappy with what it claimed was an "inadequate" system provided by EDS, filed suit against EDS asking $115 million in damages.

EDS filed a counterclaim asking that Schaefer either pay for the system or return it. It was in response to the counterclaim that Motley handed down her decision.

Schaefer then appealed Motley's ruling, known as an order of replevin, and EDS protested Schaefer's appeal on grounds the replevin order could not be appealed.

EDS claimed only final orders can be appealed and the replevin order was not final. The appeals court ruled against EDS.

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In Dispute Over Management, Money

State, Developer of Medicaid System Trade Lawsuits

By John P. Hebert
Of the CW Staff

RALEIGH, N.C.— North Carolina and Health Application Systems, Inc. (HAS) exchanged lawsuits recently in a controversy over HAS' management of the state's Medicaid program in the past two years.

The services HAS had been furnishing under the state's Title XIX Medicaid contract came to an abrupt end Dec. 31 when the state terminated the HAS contract and called in the Federal Division of Texas-based Electronic Data Systems Corp. to finish the job HAS had started 15 months earlier.

The contract called for HAS to process and pay the state's Medicaid claims on an "at-risk" basis and for a fixed price of $405 million, which was to be paid by the state in two equal installments.

Things went well for a while, but in early May 1976 the computer printouts listing North Carolina Medicaid recipients indicated HAS was processing far more claims than originally provided for by the contract, according to an HAS spokesman.

In August the parties reached a mutual agreement in which the state gave HAS $19.7 million to compensate for increased processing costs. Those added costs resulted from legislation boosting the amount the state would reimburse nursing homes and intermediate care facilities for services to Medicaid patients.

Bergen Brunswig Corp., HAS' parent company, said it wanted $25 million to cover the processing cost increase, but settled for the smaller amount. "If we had to litigate, it would have been in North Carolina, where we were not sure of a fair trial," Bergen Brunswig chairman Emil P. Martini Jr. wrote in a recent Interim Report.

"That comment is a slap in the face of all North Carolinians," William W. Webb said. Webb, assistant state attorney general, explained North Carolina wasn't prepared to assume management of the program from HAS at the time of the August agreement.

And if the problem wasn't settled, HAS said it would not continue the program, he added.

Late in February, North Carolina asked Bergen Brunswig to pay the state $6.9 million, claiming that the indebtedness of HAS exceeded any amount which the state may owe HAS.

HAS refused and instead brought suit for $4.6 million — the amount it claimed will cover "outstanding invoices" for services rendered under the claims processing and management contract.

The state responded with its own suit totaling $27.4 million and including charges ranging from breach of contract to negligence. It is asking for $6.9 million for breach of contract and misrepresentation and $11 million for tortious conduct, including personal injury, negligence in not developing a certifiable Medicaid Management Information System and conversion of part of the $19.7 million awarded to HAS' in August to pay for the risk period claim, Webb said.

The third portion of the $27.4 million lawsuit asks the corporation to pay $9.5 million in punitive damages, Webb said.

The state, he added, would not have brought suit if HAS had lived up to its responsibilities in managing the program and paying the $6.9 million requested.

Provisions Exercised

In discontinuing HAS' services 11 months early and letting a new request for proposal (RFP), the state exercised provisions in the HAS contract, Webb said. The new RFP called for a contractor to manage Medicaid claims processing from 340,000 eligible recipients.

North Carolina is asking for a jury trial to hear the case, Webb said.

Both parties are presently awaiting discovery to provide a basis for the allegations, he said.

Couple No Longer Terminally Separated

BUFFALO, N.Y. — Love comes in mysterious ways. For Laura Gibson, corporate computer operator at National Gypsum Co. here, Cupid's arrows flew through Codex modems to strike the heart of Erby Norris at the company's Cement Division in Detroit.

After several months of daily voice communication, true love began coursing through the communication lines along with the pulsating beat of data.

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Bettors' Adviser Using Mini To 'Beat the System'

By Esther Surden
Of the CW Staff

HOLLYWOOD, Calif. — The publisher of *Gambling Times* is betting that his small business system can beat the odds at the track or predict the outcome of sporting events.

And he has programmed his system to do just that.

A computer can be used to beat the system in "things like horse racing and sporting events where information about past performance is available," Stanley Sludikoff explained.

"Actually, I am certain I can come up with something in thoroughbred racing. It may not be able to tell what horse will run first in every race, but it will tell me to pass on a race at times if the odds aren't correct or if there are too many inconsistencies in the data," he said.

The system may even be able to find out if jockeys and trainers are performing ethically, he added. For example, some trainers will tell a jockey to come in third if "there are not decent odds."

With a computer tracking system, "it may be enough to get that trainer off the track." This kind of practice has never been proved, although often suspected, he stated.

Sludikoff has had experience in "beating the system" using computer methods and has written two books on beating casinos at blackjack. Card games have available information to work from, he said, but games such as craps and the roulette wheel are based only on luck.

The system in use at SRS Enterprises, Inc., *Gambling Time's* parent company, is a J-100 from Jacquard Systems in Santa Monica, Calif. "I had been dealing with computer salesmen for some time," Sludikoff said, and he chose the Jacquard because "it's an easily expandable computer and you're not locked into it like IBM."

It also has "a superpowerful language," — an extended form of Basic — and good techniques for data storage that "give you a great deal of utilization" of the machine. "There is great harmony in the hardware and software design," he said.

Other Applications

But gambling isn't the only application for which the system is being used, according to Sludikoff. The J-100 handles accounts and correspondence for the magazine's growing subscriber list.

Advertising analysis and inventory control are also handled on the system to help improve scheduling and consolidate printing, Sludikoff said.

Accounts receivable and check writing will also be done on the small unit, although payroll will not because "the banks here do it so cheaply," he said.

All of the programming is done in-house, he noted, "because the mailing list is valuable and we can't let it out."

Sludikoff is extremely pleased with the system he chose and said the computer industry in general should follow Jacquard's move toward flexible systems. His can be expanded with other makers' peripherals, he indicated.

"Most machines are deliberately designed to be replaced or modified," he said. Software is hard to get and "ridiculous prices are being asked for it."

The system he is using circumvents these problems, he said.

Calendar

June 1, Washington, D.C. — **Eastern Regional Meeting of the Institute for Software Engineering (ISE).** Contact: Kem Clawson, ISE, P.O. Box 637, Palo Alto, Calif.

June 1-2, Chicago — **The Financial, Marketing and Operational Aspects of Distributed Banking Facilities,** sponsored by Frost & Sullivan, Inc. Contact: Bob Sanzo, Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

June 1-3, Poughkeepsie, N.Y. — **Software Seminar for Software Industry Association Members,** sponsored by IBM. Contact: Grant Leschin, Industry Relations, IBM, White Plains, N.Y.

June 2, Gaithersburg, Md. — **Systems and Software: Operational Reliability and Performance Assurance,** sponsored by the Association for Computing Machinery Washington, D.C., chapter and **National Bureau of Standards** (NBS). Contact: Stewart Katzke, A265, Technology Building, NBS, Washington, D.C. 20234.

June 3, Gaithersburg, Md. — **Telecommunications Technology and Libraries.** Contact: Patricia W. Berger, Chief, Library Division, National Bureau of Standards, Washington, D.C. 20234.

June 5-8, Atlanta — **11th Annual International Security Conference.** Contact: Executive Director, ISC, 2639 S. LaCienega Blvd., Los Angeles, Calif. 90034.

June 6-7, Williamsburg, Va. — **IEEE Computer Society Workshop on the Model Curricula in Computer Science and Engineering.** Contact: Prof. David Rine, Computer Science Department, University of Texas, San Antonio, Texas 78285.

June 6-9, San Francisco — **How to Develop an Effective Long-Range Data Processing Plan,** sponsored by Keston Associates. Contact: Dr. Robert Keston, Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

June 7-8, New York — **The Market Effect and Impact of Digital Transmission.** Contact: The Yankee Group, Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138.

June 8-10, Chicago — **Manufacturing Data Systems,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

June 8-10, San Francisco — **Contracting for Services,** sponsored by Loyola University School of Law in cooperation with Federal Publications, Contact: Contracting for Services, Federal Publications, Inc., 1725 K St. N.W., Washington, D.C. 20006.

June 9-10, Falmouth, Mass. — **International Symposium on Computer-Aided Seismic Analysis and Discrimination,** sponsored by IEEE/Computer Society. Contact: Prof. C.H. Chen, Electrical Engineering Department, Southeastern Massachusetts University, N. Dartmouth, Mass. 02747.

June 12, Dallas — **Symposium of Health Computing Careers,** Dr. Karen Duncan, Office of Computer Resources, Medical University of South Carolina, 80 Barre St., Charleston, S.C. 29401.

June 13-16, Dallas — **National Computer Conference** 1977. Contact: American Federation of Information Processing Societies, Inc., 210 Summit Ave., Montvale, N.J. 07645.

June 13-14, Boston — **Conference to Examine Results and Trends of New Department of Defense Manufacturing Production Initiatives and Their Impact on Industry.** Contact: AIIE Conferences, P.O. Box 1710, Suite 1403, 444 W. Ocean Blvd., Long Beach, Calif. 90801.

June 13-15, Chicago — **Seventh Annual Institute on Hospital Information Systems,** sponsored by the American Hospital Association (AHA). Contact: AHA, 840 N. Lake Shore Drive, Chicago, Ill. 60611.

June 20-23, Hartford, Conn. — **1977 National Government Management Information Sciences Conference** Contact: Andrew O. Atkinson, Room 900, 138 Court St., Cincinnati, Ohio 45202.

June 21-23, Washington, D.C. — **31st Annual Convention of the Armed Forces Communications and Electronics Association (AFCEA).** Contact: Judith H. Shreve, AFCEA, Skyline Center, 5205 Leesburg Pike, Falls Church, Va. 22041.

June 21-23, New York — **1977 Input/Output Systems Seminar.** Contact: Input/-Output Systems Association, P.O. Box 1333, Stanford, Conn. 07904.

June 22-24, San Franciso — **Applying the New Data Processing Technology: Hardware, Software and Communications,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

June 27-29, Houston — **Fifth International Conference,** sponsored by EDP Auditor's Association. Contact: Stan Barnes, Registration Chairman, P.O. Box 61790, Houston, Texas 77208.

June 27-29, New York — **Laser Beam Information Systems,** sponsored by the University of Chicago. Contact: Information Systems Seminars, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

June 27-29, Washington, D.C. — **National Conference on Computer Systems Productivity.** Contact: Institute for Professional Education, 1901 N. Fort Meyer Drive, Arlington, Va. 22209.

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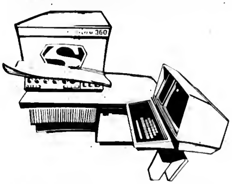

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Emphasis on Performance, Costs

NCC '77 Sessions Set to Explore Innovations in DP

DALLAS — A program aimed at exploring innovations that are now having a significant impact on applications and performance levels in DP will be featured as part of the 1977 National Computer Conference (NCC) here June 13-16.

Special attention will be paid to performance standards and the measurement of cost-effectiveness, according to the American Federation of Information Processing Societies, Inc., the conference sponsor.

Major coverage also will be given to networking and data communications, distributed computing, microprocessors, security, and remote terminal emulation. Software — including software management, symbolic evaluation, programming languages and validation — will also be emphasized.

The conference will also feature 42 sessions on management and applications plus a separate series of 11 full-day professional seminars.

This year's conference program, under the direction of Dr. Robert R. Korfhage of Southern Methodist University, includes a total of 89 sessions.

Data Base Technology

Data base technology will be examined in a four-day program covering areas ranging from advanced concepts and self-organizing/self-optimizing data bases through management and user experience. Included will be an assessment of the increasing maturity of the field, with emphasis on data base standards.

A session on data models will explore both theoretical aspects and practical application — including their use in designing future data base systems. A panel on data base design will examine efforts aimed at developing methodologies using an enhanced comprehension of the design model, rather than intuition.

Additional sessions will explore such topics as automated techniques for restructuring heuristically adaptable data base systems, the maturing role of the data base administrator, integration of numeric and textual data and the current status of relational data base systems and user experiences, Afips said.

Computer architecture will be covered through a four-day program examining topics ranging from microprocessor architecture and pattern recognition through consideration of distributed processing and fault-tolerant computing.

Special attention will be given to modular, multiprocessor computer systems through analysis of "Cm*" — a project under way at Carnegie-Mellon University. Included will be presentations on architecture and basic operating experience, as well as supporting software.

Additional highlights include a session in which industry experts will attempt to pinpoint major advances expected during the next five to 10 years and their effect on computer science disciplines; an examination of system selection techniques employed by a joint Army/Navy committee in evaluating alternate computer architectures for development of a family of software-compatible military computers; government research activities, with emphasis on processor design and hardware-software trade-offs; and analyses of the relationships among distributed processor systems, microprocessors and fault-tolerant computing systems.

Onward To Dallas

Rounding out this portion of the '77 NCC program will be a variety of additional sessions covering such topics as networking and data communications, remote terminal emulation, symbolic evaluation, software management and security.

A full-day program on networking and data communications will feature a formal debate on the implications of nationally monopolistic data networks and their relationship to international data communications.

Remote terminal emulation will be reviewed with emphasis on the current state of the art plus recent reports reflecting user and vendor viewpoints. The session on symbolic evaluation will assess its impact on future programming activities and its use as an alternative to formal proof of correctness.

In addition, a half-day program on the starting of a software development project will focus on techniques in organizing, recruiting and training for the new project; use of software development methodologies; measurement methods and reporting procedures; test procedures and program verification; and documentation of the final product.

Computer security will be examined with emphasis on risk assessment, including a description of an assessment methodology now in commercial use, plus analyses of related issues with emphasis on designing cost-effective security systems.

Honors on Pioneer Day to Go To Los Alamos Computing Group

DALLAS — The honors will go to the Computing Group of Los Alamos Scientific Laboratory (LASL) in New Mexico when the National Computer Conference (NCC) celebrates Pioneer Day on June 14 here this year.

The Pioneer Day program will emphasize various technical activities at LASL including the development of Madcap, a high-level language which permits two-dimensional input of mathematical expressions; the jointly designed MCP system for the IBM 7030 Stretch computer; and LASL's contributions in computer-generated film recording.

"Research in computer science has vigorously been pursued at LASL since its inception," according to Dennis J. Frailey, organizer of the Pioneer Day program.

"Beginning with such pioneering efforts as the development and installation of the Maniac I in 1952, the Computing Group has worked at the forefront of new developments in computer technology and related mathematical computation — including the recent installation and testing of the Cray 1," Frailey said.

The group also developed the Monte Carlo method and its application to a variety of physical problems and designed one of the nation's best known image-processing libraries.

The program for Pioneer Day will include one session during which key members of the laboratory will assess the group's contributions and discuss current and projected activities. Photographs and computer components Illustrating early developments at the laboratory will be on display.

NCC will be held June 13-16. Further information is available from the conference sponsor, the American Federation of Information Processing Societies, 210 Summit Ave., Montvale, N.J.

Special Tours of 'Sunbelt Hub' Available to Conference-Goers

DALLAS — DPers attending the National Computer Conference (NCC) here next month are being offered easy economical tours of the Dallas-Fort Worth area, considered by some to be "the hub of the nation's sunbelt."

Special tours on a "first-come, first-serve basis" will be available on all four days of the '77 NCC.

Tea at Neiman's

Monday's tour will feature an overview of Dallas, including a number of landmarks and residential areas, winding up with tea and shopping at Neiman Marcus.

Tuesday's program will include a tour of some of Dallas' outstanding private residences, a fashion show at Lord & Taylor's and shopping at two of the city's most popular shopping centers.

Wednesday's tour will feature a visit to the Quadrangle — a Spanish-style enclave of fine boutiques.

Thursday, NCCers will be invited to brunch at Brennan's, a New Orleans-style restaurant, plus a visit to European Crossroads.

Reservations for the tours can be made by contacting Karol Frailey, NCC Local Tours, 1109 Grinnel Drive, Richardson, Texas 75081.

In Toto

DALLAS — Detailed information on the 1977 National Computer Conference (NCC), to be held here in the Dallas Convention Center June 13-16, is contained in an illustrated 18-page brochure just published by its sponsor, the American Federation of Information Processing Societies, Inc. (Afips).

The brochure contains an overview of this year's NCC, a preliminary listing of more than 300 participating exhibitors, a synopsis of the conference program of 89 sessions, descriptions of the 11 professional seminars and information on special programs and events, plus a complete listing of all sessions and seminars — including a four-page "Conference-at-a-Glance" showing each session by day, time and chairman.

Complimentary copies of the brochure are available upon request to Afips Headquarters, 210 Summit Ave., Montvale, N.J. 07645.

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Rumanian Praises DP Training That Led to Job in New Country

NEW YORK — The Manhattan Community College DP program gives East European immigrants a chance to learn the DP profession in this country.

"It was great luck for us to discover the program," Otilia Schachter, a recent Rumanian immigrant, said. "My husband, Armand, and I were professionals who had recently left Rumania and couldn't find jobs in this country.

"The International League of Russian Immigrants helped us find out about the program and we enrolled," she said. "In a very short time we obtained theoretical as well as practical knowledge and, best of all, jobs.

"I work as a programmer at Westvaco Co., a large paper manufacturer, and my husband is a programmer for the New York City Housing Authority," she said.

"We arrived here in August and started the six-month program in October," she recalled. "The program is well organized and oriented toward people like us. It was unbelievable that we could take advantage of English lessons as well as learn DP."

In Rumania, Schachter and her husband were educated in engineering, but they both like DP and enjoy their jobs as programmers, she said. "I plan to go on and get my master's," she added.

Schachter likes the U.S., thinks the people are friendly and has had few difficulties adjusting to her new life, she said.

The Manhattan program began in August 1976 (see Page 11) and has had a 98% success rate in finding jobs for its students. "The East European students are very serious about their studies and are not afraid to put in the time needed to complete the program," according to Cynthia Zucker, head of the college's DP department.

"Language is a problem for some of them, but once they get a job they are just like any American worker," Zucker said.

A/V Vendor Offering Courses on Unionism For Management

SCHILLER PARK, Ill. — Continuing a trend developing among the major audiovisual (A/V) vendors, Deltak, Inc. recently announced a quartet of courses directed at management concerns to supplement its traditional lessons on technical DP problems.

All the videotaped courses in the latest group are concerned with unionism. Developed by Van de Water Associates, Inc. of Canoga Park, Calif., they are titled "The Employer, The Union and the Law," "Unionism, A Manager's Viewpoint," "Avoiding Unionism", and "Non-Union Campaigning."

The first film was described by Van de Water as a "completely objective presentation to employees of private, federal labor law." It is said to clarify what constitutes illegal acts and practices of employers, employees and unions.

The "Unionism, A Manager's Viewpoint" film explains the rights and duties under federal law of private-sector supervisory and upper management personnel in dealing with union organizing campaigns and with unions.

"Avoiding Unionism" is said to be "not antiunion." It shows, however, that a union is often not needed and that there are seven key points which are helpful in developing a direct relationship between management and labor, Van de Water said.

The fourth video-based course illustrates what a union is permitted to do and how management can respond to these activities while avoiding various legal pitfalls.

Each of the four courses runs about half an hour. They are available under various rental plans, Deltak noted from 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

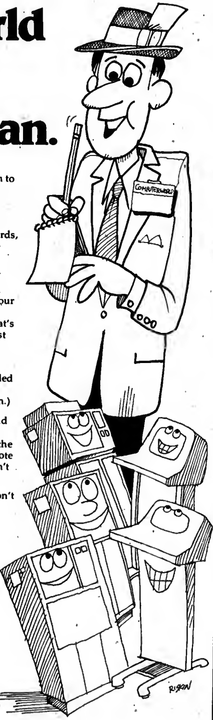
Info/Expo Theme Chosen

PARK RIDGE, Ill.— "Management Development — Today and Tomorrow" is the theme selected for Info/Expo '77, the 26th annual international DP conference and business exposition to be sponsored by Data Processing Management Association (DPMA) in Washington, D.C. Oct. 9-12.

George H. Nagel, acting director of finance of the Washington Suburban Sanitary Commission in Hyattsville, Md., is general chairman of the conference and exposition to be held in the Washington Hilton Hotel.

The committee has arranged for 50 seminars in four general areas: management functions and skills; technological forces and trends; business and industry applications; and special subjects.

Computerworld covers NCC as only a newsweekly can.



The 1977 NCC promises to be bigger than ever, with a return to the boomtown level of 1,000 booths or more. Plus there'll be even more to see this year with the addition of a "Personal Computing Fair", including exhibits, speakers and technical sessions on this new area of computer use. *Computerworld*'s coverage will be bigger than ever, too, with thousands of words, hundreds of pictures, and three special issues devoted to the news of NCC.

June 6th — Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. (If you forget to bring your copy of *Computerworld*, don't worry. Free copies will be available at our booth.) This issue can help you pinpoint what's of interest to you before you attend, so you can make the most of your time there.

June 13th — Show Issue: The Show Issue will include all the late breaking stories, program changes, intended product announcements and behind the scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 20th — Wrap-Up Issue: Cohesive analysis and summary of the significant events of the '77 NCC. This issue will give details on product announcements and will review the content of technical sessions, expert's observations and keynote speeches. If you have an interest in what goes on at NCC, don't miss it.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld*'s NCC issues:

Preview Issue (June 6th) — Color and insert close: May 20; B&W close: May 27.

Show Issue (June 13th) — Color and insert close: May 27; B&W close: June 3.

Wrap-Up Issue (June 20th) — Color and insert close: June 3; B&W close: June 10.

For complete details contact your *Computerworld* salesman. Or call Terry Williams at (617) 965-5800 to reserve space for your ads.

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It Began With a Phone Call...

Special DP Program Prepares Russians for U.S. Life

By Karen Hartman
Special to Computerworld

NEW YORK — It's a long journey from the steppes of Russia to the "canyons" of midtown Manhattan, but with the aid of an innovative program at the Borough of Manhattan Community College 100 men and women are making the transition successfully.

They are enrolled in an intensive DP course geared to making them productive members of the business community in as short a time as possible. So successful is the program that most of the first group of 20 students were placed before they had fully finished the in-depth classroom schedule.

All this was made possible by a grant from the U.S. Department of Labor to the League for the Repatriation of Russian Jews, the students' own motivation, the college's hands-on approach to DP instruction — and a desperate phone call.

Began With Phone Call

It began with the phone call to Cynthia Zucker, chairwoman of the college's DP department, from a friend. The friend had a problem and, quite unexpectedly, Zucker had a new challenge. The friend was concerned with placing highly educated new arrivals in good jobs.

He had heard about the success that Manhattan Community had had with giving students from varied backgrounds the right business skills to get and hold good jobs.

The response was an intensive curriculum, designed specially for this group and combined with a list of required entry-level skills. After approvals were gained, prospective students were screened and tested. Eventually 100 were chosen and enrolled in the program.

The students had an average age in the low 30s and many had been engineers in Russia. An English competency test had to be passed and all instruction was done in English.

Once the population was identified, work began in earnest.

Students were required to take an additional 180 hours of English — a specially prepared class which stressed business terms, conversational idioms and computer terminology. They learned not to get "hung up" on buzzwords as well as how to communicate their skills on the job.

Hands-On Work

They also got more than 500 hours of DP work — including programming in Cobol, Fortran, RPG and Assembler. All of this was done in a hands-on fashion. Students wrote, keypunched, ran, debugged and documented a myriad of business application programs.

They worked with both DOS and OS, learned about time-sharing on terminals, mounted tapes and disks, wrote JCL and produced running systems using Isam files, sort verbs and many other DP facilities.

Additionally, they were given 60 hours of business theory and accounting practices to help them find their way around the free enterprise system.

Faculty members praised the diligence and self-motivation of the group, citing their involvement in the computer room and their enthusiasm for succeeding. Fourteen of the first 20 were hard pressed to complete their studies — they had already proved their worth to employers who were anxious to have them working full-time.

Manhattan Community has been an innovator in DP education since it began teaching the subject 12 years ago. The school has always strived for a hands-on approach and a practical slant to all its classes.

Students run their own programs in DOS and OS environments using both batch and time-sharing. They are forced to become involved with every phase of DP from the first class on. They are taught by a faculty with a unique requirement of its own: Every faculty member must have at least five years' commercial DP experience as well as academic credentials before he can begin teaching.

The Human Connection

Practical business problems are featured and all students run the school's computer and help with computer room organization and operation. Many of the students help process the college's administrative work, all of which is done by the in-house facility.

The systems class goes into the field to design solutions to actual problems at sponsor companies. Internships allow many of the students to work while they learn — with employer ratings a key part of their grades.

An Industry Advisory Board meets monthly with the faculty to assist in selection of hardware and software, review the curriculum and arrange for internships and business visits. More than infrequently, members of the board hire graduates themselves.

The author is a technical manager with a major installation in New York City.

NCIC Records Logged At Over Six Million

WASHINGTON, D.C. — The Federal Bureau of Investigation's National Crime Information Center (NCIC) now contains 6,371,695 active records.

The data base breaks down as follows: 129,308 wanted persons; 837,577 stolen vehicles; 269,520 stolen license plates; 1,080,628 stolen articles; 1,134,719 stolen guns; 1,912,766 securities; 12,648 boats; 982,324 criminal histories; and 12,205 missing persons.

In March, 8,204,429 transactions were processed over the NCIC network, with an average of 264,659 per day.

The peak hour was between 1 a.m. and 2 a.m. Eastern Standard Time, with more than 12,000 transactions during those 60 minutes. On St. Patrick's Day, March 17, a record number of 311,110 transactions were processed, averaging 3.6 transactions per second, the NCIC said.

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Users Briefed on Software Design, Program Trends

By Ann Dooley
Of the CW Staff

ST. PAUL, Minn. — Many DPers think of a computer consultant as "someone who borrows your watch to tell you what time it is," Houghton Smith, a consultant with Arthur Andersen Co., told a Computer Caravan audience here recently.

But Smith had some ideas to communicate on developments that are of growing concern to DP managers.

In the structured programming and design area, "high employee turnover rates" are occurring. At some places the turnover is 25% a year; in others, it reaches 50% a year, Smith noted.

In addition, because of the increased and widespread use of computers, the need for DP personnel has increased. The costs for such personnel are also increasing because of the need for continued on-going training made necessary by technical advances in hardware and software, he told his audience.

In the area of software alternatives, there is an increased availability of software after unbundling and the trend is away from custom development, Smith said. System software will be enhanced and application software will be more flexible, he predicted.

"There is also a trend toward modular design and stand-alone units," he added.

The trends in measuring systems utilization include a shift in cost structure. Hardware is no longer the most costly item, but people are still intensely interested because it consumes a large portion of the DP budget, Smith said.

Increased Reporting

There has been an increased amount of utilization reporting to non-DP management, while job accounting systems are providing better information. An increasing number of software monitors are becoming available, he noted.

Higher level languages such as Cobol, Fortran and PL/I are being used more frequently as documentation and maintenance aids, Smith said.

Programmer productivity is also increasing, the speaker added. Software aid use and revised techniques have contributed to improved efficiency by reducing the clerical efforts for programmers.

Top-Down Designing

Smith detailed the structure of documentation and maintenance aids for his audience. "Using a top-down design, you look at the broad business functions and work down," he said, noting that the top-down style can apply to testing as well as design.

The top-down method is better than bottom-up, according to Smith, becaues it reaches the implementation phase sooner and gets faster results.

Top-down program documentation is beneficial because it looks at both overall and individual business functions. It helps identify common functions and determines program design and module functions, he explained.

Smith also outlined the benefits of structured programming, telling his audience that it pinpoints objectives and gives an overview of the entire sytsem.

In addition, it examines its relation to the top-down design and spots inefficiencies if any have occurred, he said.

Structured programming also gives the developer a chance to perform "walk-throughs" during which he can pick up any problems, according to Smith.

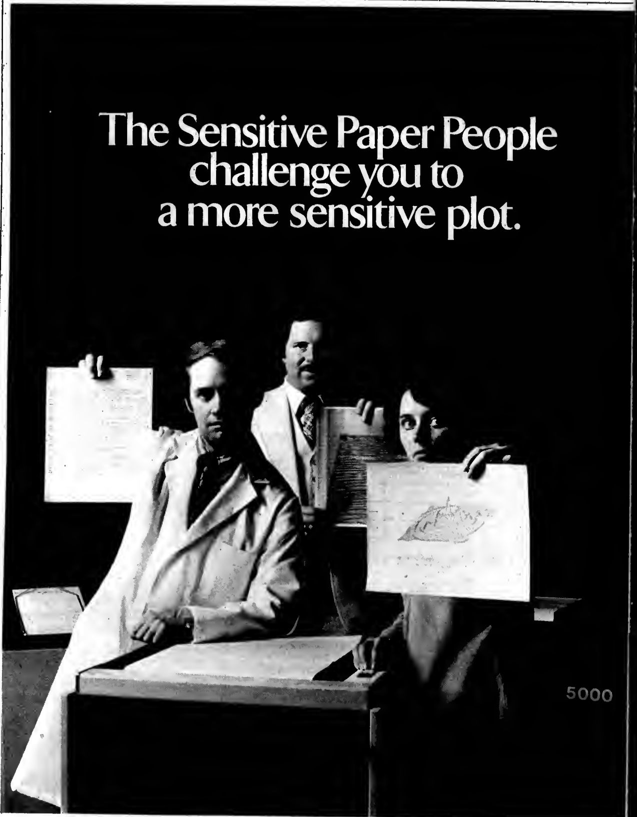
Commission Invites Comments on EFT

WASHINGTON, D.C.— The National Commission on Electronic Fund Transfers (EFT) has issued an open invitation for public views and reactions on the competitive implications of widespread EFT system development.

The commission, in its invitation to interested groups and individuals, said it is "seeking to understand if EFT will fundamentally alter the way industries compete with each other" in offering financial services to consumers, or whether EFT will place one institution or type of institution at a competitive disadvantage over another.

The inquiry covers the competitive impact of EFT on industries to date, what the competitive situation over the next five to 10 years among different types of organizations will be if the commission's interim recommendations are implemented.

Anyone interested in submitting comments should file written statements and any supporting documentation by June 1 with the Executive Director, National Commission on EFT, 1000 Connecticut Ave. N.W., Washington, D.C. 20036.



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Because Management Unsupportive

DPers Urged to Become Advocates of Their Own Cause

By Ann Dooley
Of the CW Staff

ST. PAUL, Minn. — It's "pure hogwash" to think people can exist without computers, according to Dan Magraw, assistant commissioner of administrative services for the State of Minnesota.

Computerization is cost-effective, he said. "We've automated our departments within the state and our total budget, excluding education, has gone down in the last three years, even with more work being done," he noted.

But the management information system (MIS) concept is misunderstood and unappreciated by the public at large and by non-DP management, Magraw told Computer Caravan attendees here recently.

"We can't just do our job anymore, we must become advocates on our own behalf," he contended.

Since top management is still unsupportive, "we can and should know everything that's happening in our departments and the industry so we can educate them."

One of the major changes to watch is the minicomputer, he said. Minis are "still finding their place in the industry and lots of people will be crucified in the process," Magraw said.

If a DPer knows how they would be best used in his department or even if they should be used, management will want to know why, Magraw told his audience.

"We should use computers themselves to decide alternatives of the kind of system which would be best for our own use," he said. That decision is final, but the rate of change in technology is so rapid DPers must be sure of what they do, he added.

Magraw then outlined a set of guidelines to assure management support. "The DPer must set up certain standards to help him with his job," he explained.

Crucial Decision

One of the most crucial things is to decide on the design of the system, he said. If a DPer can't decide or If he makes the wrong choice, it's like "spending time polishing brass on a sinking ship."

Magraw suggested outlining an organizational structure. The DPer must ask himself what importance is placed on software, systems, programs and on technical support, he told the Caravan attendees.

And once he has decided for himself, it must be agreed upon by management, he added.

Another guideline to follow is to instill organizational discipline. Everything must be studied carefully and no step taken without it leading in a planned and purposeful direction, he said.

The climate for credibility under which the DPer must work is a terrible problem, according to Magraw, and can only become better.

Another rule to follow is to establish a set of policies. Questions such as in-house support, transferability of systems, standards and a multitude of other details must be planned, he said.

The last step is a formal planning process between the DPer and management, he told the gathering. Management must be made to understand why things are happening and how, he said.

"The most important thing is to make sure management is on the hook with you so they can't blame it on you if something goes wrong," Magraw said. "But forcing that issue is the most difficult."

To establish a change in attitude, computer people must be the prime changers, he said. "Leadership in this crusade must come from every level, but we must assert it," he concluded.

Hansen Salary Survey Due Out in September

LAKE BLUFF, Ill. — "Hansen's 1977 Weber Salary Survey on Data Processing Positions" will be available Sept. 1.

Published for the 13th consecutive year, the survey report will cover salaries paid to 12 categories of personnel including DP management, systems analysts, applications programmers, operators, data base management, telecommunications specialists, documentation specialists and analyst/programmers.

Salaries will be presented in terms of competitive averages by city, industry, size of installation and nationally, according to A.S. Hansen, Inc.

The survey included 1,150 employers, 83,640 salary rates, according to Hansen.

The survey is said to give DP executives an idea of their status within their companies, with a look at organizational relationships, company officership and eligibility for bonus and stock plans.

More information is available from Hansen at 1080 Green Bay Road, Lake Bluff, Ill. 60044.

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Geneva: CAP/SOGETI
Hague: CAP-GEMINI/PANDATA
London: GEMINI Ltd.
Melbourne: Shell Oil Co. of Australia
Milan: SYNTTAX
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The Waves of Change

By Charles P. Lecht

With this installment, Computerworld *continues excerpting* The Waves of Change, *a soon-to-be-published book by Charles P. Lecht, president of Advanced Computer Techniques Corp. This week Lecht continues his exploration of the changing relationship between software and hardware and discusses some important software developments he sees coming within the next decade.*

CHAPTER II (Continued)

A 1976 survey of nearly 600 medium- to large-scale IBM 370 accounts which were using data base management systems showed that less than 200 were using IBM's new IMS/VS package; approximately another 100 were using the older IMS 2. Thus, fewer than one-third were using IMS/VS.

Many users seemed to prefer Cincom Systems' Total (120 users). When asked whether current IBM data management software met the users' near-term needs (that is, two to five years out), more than 50% responded that they viewed the current IBM offering as "inadequate."

At a recent (mid-1976) meeting of IBM users in New York City (reported by the Institutional Research Department of Morgan Stanley & Co.), IBM's key offering for large-scale data base customers was given very low marks by those who had attempted to implement it. Reports regarding performance and lack of flexibility were sufficiently negative that many users are reluctant to consider migrating to IMS and may wait for an entirely new IBM-developed data base system in the later part of this decade.

IBM's failure to develop a satisfactorily performing, easy-to-use data base system undoubtedly will cost the company significant drag-along hardware systems sales and, hence, growth.

Long-Term Problems

IMS/VS apparently has substantial long-term problems which do not appear easy to remedy, according to Dr. Weil, Morgan Stanley's computer industry analyst. For example:

1. Some users consider IMS/VS an "architectural monstrosity" because it is based on OS/360 technology which includes much that is now redundant within the Multiple Virtual Storage (MVS) structure.
2. IMS/VS uses its own access facilities and scheduler rather than utilizing those of MVS. This results in rigidities and performance penalties which a number of users find intolerable.
3. The IMS structure is much too limited in the data inquiry or retrieval applications arena at a time when IBM is beginning to consider senior management and end users as the most likely sources of continued growth in computer capacity (and revenue).
4. IMS is built on a hierarchical concept as opposed to a relational and network data base concept. Relational data base structures, such as those implemented by National CSS and Tymshare, are useful in handling end-user-oriented, "what-if"-type questions. But relational data bases require associated machine architectures in order to give users adequate performance.

In summary, the user consensus seemed to be that IMS/VS is of a quality ranging somewhere from "poor" to "ghastly." There is real concern within IBM regarding the poor image of IMS and its lack of flexibility, since the corporation looks to data base management and migration as a major tool to fuel future hardware growth.

In contrast, user reports and independent studies or surveys completed by the Datapro Research Corp. indicate that Univac's DMS-1100, Burroughs' DMS and Honeywell's IDS offerings, which are Codasyl-compatible, are deemed far superior to IBM's IMS/VS.

Potential Remedy

While IMS/VS may be considered the most exposed of IBM's several Achilles' heels, it is also more than likely that IBM will solve its data base problems. However, the 360 time-sharing development fiasco suggests that *even* IBM's power, at times, cannot overcome its failures.

A potential remedy could be the incorporation of most of IMS' functions into a new release of the MVS operating system with microcode (firmware) performance improvements. A number of competing data base development projects are under way within the corporation.

Projects with code names such as Xram and Xquel are said to exist. Others, like Sequel (Structured English Query Language) and QBE (Query by Example) were first reported in 1974.

While the final outcome of the ongoing interdivisional debate over IMS cannot be accurately forecast, it is clear to Morgan Stanley's analyst that any new data base offering replacing IMS cannot be fully implemented until later in this decade, perhaps in the timeframe of System/80 in 1978 or 1979.

At that time, a truly efficient relational data base product should be available which will resolve most of the user concerns. In the meantime, the major competitors, such as Univac, Burroughs and Honeywell, continue to enjoy an advantage in the all-important data management area.

Application Generators and Beyond

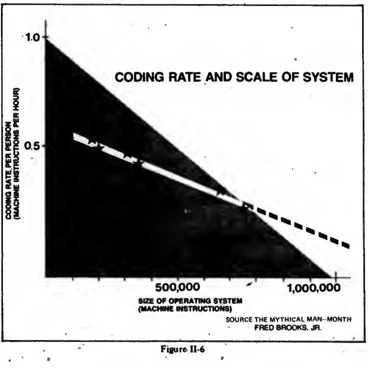
By 1980, a "new style" of applications development should be available which will help resolve some of the current major problems in usage of computers and computer networks. The growth of the computer industry will certainly be stunted if the present methods of applications development are continued.

The demand for experienced applications analysts and programmers will clearly exceed the supply if the present software "craft" methods are allowed to furnish. Solutions must be found to eliminate the present, significant discrepancies between *what end users really want and what the analyst or programmer thinks they want.*

Moreover, in today's environment, the presentation of identical applications requirements or specifications to individual implementors results in many different and unique solutions and designs. All too often the "software wheel" is reinvented — over and over again.

Furthermore, programmer productivity declines precipitously in direct proportion to the size of a program (see Figure II-6 from *The Mythical Man-Month* by Dr. F.P. Brock Jr.). An applications generator approach could drastically reduce the above problems in the structural design of applications.

Clearly, many of the applications systems have already been defined over and over again, and many of the characteristics of the data they use are known. Proper attention paid to applications generation will provide incredible returns.



SOURCE THE MYTHICAL MAN–MONTH FRED BROOKS, JR.

Figure II-6

Beyond any shadow of a doubt, IBM (as well as several other major manufacturers) are currently developing applications generators for the "System/80 era," An example of this is reported in the *IBM Journal of R&D*, Vol. 20, No. 4, July 1976. In fact, one of the key reasons for redirecting the so-called "FS" (Future System) project was reportedly the lack of a solution to the applications development problem.

The new generator techniques will include "transaction descriptions" created by professional programmers and "transaction menus" designed for end users offering many alternative selections.

As reported in the Wiley-Interscience report ("Data Processing, 1980-85 — Study of the Potential Limitations to Progress"), "The generator would view each application as a hierarchically organized set of building blocks that are to be tied together (binding) in a manner dictated by the choices offered by the generator and selected by the developer (application implementor)."

Generators will be provided for different classes of applications (inventory control, payroll and accounts receivable, for example) for specific industries or businesses as well as across industries.

Macro-generative coding techniques are held by many to be the key to quasi-natural language development. Powerful macroprocessors allowing language experimentation without the high cost of compiler development are being worked on with very promising results.

From micromini to supermaxi, today's hardware innovations by themselves offer no real solution to the data processing effectiveness problems that users have been encountering. For example, the creation of software to really allow distribution of a system has not yet occurred.

Users beware! If you are having difficulty in the proper use of one system, distribution will probably compound the difficulty. Adequate single-site software facilities are on the way.

When they arrive, distributed systems will mean much more than mere hardware distribution running less-than-adequate software at each site. Manufacturers will spend a lot of money in the next years to upgrade software to take advantage of today's hardware.

Lecht is the author of four previous books on computer-related matters: The Programmer's Fortran II and IV, The Programmer's Algol, The Programmer's PL/I *and* The Management of Computer Programming Projects.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

Editorial

Pluses and Pitfalls

The recent consolidation of lease and purchase contracts by IBM [CW, April 18] contains both benefits and potential pitfalls for users.

On the plus side, users for the first time have a written commitment on the liability limits which IBM will incur on both hardware and software. Whether this is based on recent court suits which sought to hold the company responsible for unfulfilled promises is not the issue.

What is important is that users can now determine whether the potential recoverable damages make it worthwhile for them to put themselves in the hands of the company. By setting a figure on its accountability, IBM is in effect telling its salesmen that the days of promising a user anything as long as he signs the contract are gone.

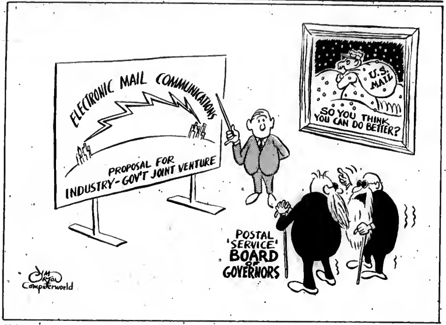
If the limit of liability seems insignificant in relation to the investment required by the customer, that may be a signal to consider getting the same capability elsewhere.

On the minus side, the four standard contract forms are virtually blank agreements that require each condition between IBM and the user to be carefully spelled out. It is true that almost all of the previous lease arrangements, purchase option credit plans, etc., will still be available under the new contracts.

But the user must be careful to detail the specific arrangements under which both parties will operate. Users would do well to model any new contract after existing agreements which spell out financial schedules and other options so both IBM and the user clearly understand what the ground rules are.

In most legal jurisdictions, an oral agreement between two parties is not a binding contract. There are many unforeseen details that can play a vital role in a contractual relationship between a DP user and a vendor.

Consultation with other users and legal advice should be sought before one of the new IBM contracts is finalized.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'What a Bunch of Blarney — See How Things Have Been Going Downhill Ever Since We Gave Up the Pony Express?'

Letters to the Editor

Lecht Chart Wrong: Volume, Not Cost, of Core Has Risen

I read with interest the excerpts from Charles P. Lecht's forthcoming book, *The Waves of Change*, in the April 18 issue and look forward to the additional installments.

However, I would like to point out that Figure I-5 showing main storage cost trends was grossly in error. Lecht apparently assumed, as have many others, that the cost of core memory has remained essentially constant since 1965.

Nothing could be further from the truth. The cost of core memory has dropped an average of 20% per year, and this trend continues today.

In all fairness, I must point out that the average main storage capacity used with computers has grown substantially over the past 10 years. For example, in 1967 the average memory supplied with a minicomputer was 4K words. Today the average memory in a minicomputer is 16K or 32K words. A similar memory explosion has occurred in large computer systems.

Thus, the total cost of main storage in computers may have remained fairly constant, but the capacity of that storage has grown by a factor of 4 to 8.

All of which brings me to the apparent second error in the chart, and one which is fairly common. It would appear Lecht compared the projected per-bit device price of semiconductor memory with the total system price of core. This is common since device-only prices are those most commonly quoted by semiconductor memory manufacturers. However, the system price of semiconductor memory is several times the device cost.

Al Horowitz
Manager
Product Management
Memory Products Division
Ampex Corp.
El Segundo, Calif.

Voice From the Unhappy Minority

Judging by the April 18 survey ["Users Not Flustered by 158, 168 Cuts"], I am apparently in that almost "nonexistent" minority which is not at all pleased with IBM's most recent price reductions. As a concerned dissenter, I would like to present a minority opinion.

To me, price reductions of this magnitude indicate one of two basic conditions: either we the users have been grossly overcharged in the past, or IBM is making a concerted effort to chase out its competitors.

Either way, the price reductions will have a negative import on many; the purchase of computers now can be viewed by the users as a more risk-laden venture than in the past. Could this new action by IBM possibly be a move by a cash-rich corporation to forcibly "cajole" us back to rental? A move which may be lucrative for IBM, but costly for the consumer?

As IBM's intrinsic source of wealth, we the users need not be resigned to the "fact that IBM can do whatever it wants," as some of the survey respondents claimed.

Indeed, perhaps if more of us were actively "concerned," we would not receive unrealistic prices in the first place or be subjected to such condescending and paternalistic phrases as the "obligation to improve the price and performance of our product line."

I believe IBM does care what we think — if enough of us are concerned and say so. If there are any other dissidents out there, let's make our position known.

Howard B. Wilson
Richmond, Va.

Data Past

Five Years Ago
May 10, 1972

LOS ANGELES — The effort to license programmers in California dissolved because of a shift in legislative assignments and a lack of any unified support. State Sen. Alfred H. Song, who had been chairman of the Senate Committee on Business and Professions, which handled licensing legislation, proposed the licensing of programmers following a study alleging faulty security during an automated primary election in Los Angeles. The attempt failed when Song got another legislative assignment and no one else took up the effort.

— — —

WASHINGTON, D.C. — Control Data Corp.'s Control Data Institutes, Lear Siegler Career Centers and Electronic Computer Programming, Inc. were cited for "deceptive and unfair" advertising and sales practices by the Federal Trade Commission.

Eight Years Ago
May 14, 1969

CHICAGO — General Electric (GE) entered the plug-compatible market in collaboration with Greyhound Computer Corp. when it introduced disk drives with the same access speed as the IBM 2311s, but priced below the IBM units. The introduction followed GE's announcement of 2311-compatible disk packs and was the first move by a major manufacturer to enter the plug-compatible market for IBM 360 series equipment.

— — —

BOSTON — The annual Spring Joint Computer Conference opened here with 34 technical sessions and a record 170 exhibits. Sponsored by the American Federation of Information Processing Societies, the conference and show allowed people in the DP field to brief themselves on the latest developments, products and services.

Small Systems People—Part 1

Close Vendor-User Ties Build Successful Software

By Jack Stone
Special to Computerworld

Dealing with the small business user involves the same systems and programming functions found in any computing systems project, but new dimensions of performance.

Computing hardware must provide vast capabilities at unbelievably low costs, systems and applications software must perform nearly miraculous feats at unparalleled levels of reliability and, perhaps even more significant, personal communications between customer and vendor must be excellent since the customer rarely has in-house expertise.

Furthermore, the typical small business user (bless them all) has an intense desire for "total systems satisfaction."

Who are these brave and hearty souls who are willing to risk their professional careers, their life savings and even their family harmony to operate a DP services organization serving small business customers?

To provide you with some appreciation of the personalities and styles that appear in the small business environment, I have prepared a series of four columns that present the true stories of four people who are the key figures in the marketing and installation of one particular small system.

The stories are those of the software vendor who supplied the applications package and installation services and continues to supply follow-on support nearly three years after cut-over; the hardware vendor for computing equipment and systems software; the systems consultant who helps the software vendor find new markets for the package; and the user who derives the benefits from the system.

The technology undercurrent of the series is Rapid, a comprehensive automated management system designed to meet the needs of radio and television broadcast stations. The system runs on Wang 2200 computing equipment.

The following narrative, the first episode of this saga, is that of Doris Goldman, owner and president of Viacomp Systems, Inc., a successful developer of software for small systems in St. Louis, Mo., and Rapid's mother.

I've been in the industry for about 14 years and have loved every minute of it.

My entry into the DP business was probably quite different from that of most people. I was 40 years old at the time, well on my way to becoming a typically neurotic suburban housewife.

My four children and physician husband shared a happy homelife with me by most standards. I was involved, as I have been for many years, with the usual wifely endeavors, but was able to pursue many of my own creative interests — interior design, sculpturing, gardening and oil painting.

Although I enjoyed these interests, I don't think I ever felt completely fulfilled at that time, but didn't know why. My work was always for my family or for charity. I never attempted to merchandise my art objects in a serious way because my husband's income was always more than adequate and I had no formal marketing or sales education.

One day my younger brother, who at the time was getting his doctorate in computer science and is now a full professor in the field, suggested I attend one of the commercial programming schools to begin my formal DP education.

Well, I attended the school. Cost me $2,000. Of the 40 people who started with the class, only three of us finished. And only I was prepared to get a job, because the other two could not accept the cut in income necessary to take a position as a programming trainee.

So I searched and searched, but I simply couldn't get a job because I had no work experience. One of my daughters suggested that I switch my volunteer work at my husband's hospital from the candy and flowers desk to the IBM 1401 installation. The hospital staff was thrilled with the idea, and I became the first programmer-trainee/candy-striper in history.

The Human Connection

Shortly after I began programming, I dragged my 10-year-old son downtown with me and taught him to operate the machine to save me time. He began programming for me at 12 and still does a lot of work for me while he advances toward his master's degree in electrical engineering at Stanford.

Because of his long-term interest in amateur radio, he was especially valuable as part of the design and programming team that developed our radio/TV station management system. I hope he comes back and takes over my systems division when he graduates, but I am fearful that he doesn't want to work for his mother.

I have always enjoyed working with teenagers and try to hire them if they can show me they have the potential for programming. One student, a junior in high school, dropped by my office one day and explained a program he had written for the analysis of echocardiogram signals. I wanted to hire him on the spot, but he told me that he was only 15 and couldn't drive.

I called his mother and said that, if she would provide the sandwich, I would pick the kid up, drive him home after work and give him his milk plus $2.50 per hour. He later wrote a positively brilliant data base management system for my minicomputer over a weekend (when he wasn't watching television).

When I first joined the industry, I thought I was too late. Now I believe that, with minis, I am on the ground floor of a new period of explosive growth in the business. For example, programming development costs for me on the mini are about 1/20 of the costs I would have incurred renting time on a large-scale system.

As a result, my company has excellent minisystem products for radio and TV broadcast stations, small city utilities and small business accounting and payroll. We do, however, maintain our list management services on a service bureau basis, using rental large-scale machines.

Perhaps my ideas for success in building a mini software business would be interesting to the readers: Try to specialize in a few key products in selected markets; this policy will help ensure a solid base of knowledge of your customer's problems.

Turn out first-class quality products and make a business of extending them as users uncover new needs. Decide early in the game whether you can handle both the marketing and technical aspects of the business (although I handle some of my own accounts, I also contract for marketing and sales support.)

Make sure you have a specialist in the customers' field who can program, rather than trying to use a general-purpose programmer.

Finally, get to know your customer personally — after all, you are, in effect, his DP department, and he depends on you.

Looking Backward Points to Trends for DP's Future

The Taylor Report

By
Alan Taylor, CDP

Computerworld's first issue came out 10 years ago, covering the Data Processing Management Association show in Boston. For those of us who were involved, the time before CW is often ignored, as though it had never been. The achievements of the last decade in the profession have been dramatic — and, we hope, have been helped by CW's coverage.

It has been a hectic time, making the early complaint by one senior computer executive — "There simply aren't enough announcements around to fill a weekly paper and nothing else really matters in our industry," — seem indicative of tunnel vision (as it was). By implication, it makes the decision to go ahead despite the gloomy prognostications appear courageous and far-sighted and flatters (perhaps undeservedly) the egos involved.

Yet I find the most interesting items are to be found by comparing the coverage of the first few CW months with the history of the previous 20 years and with our current situation.

In doing so we have to select from myriad events and show some bias accordingly. The appropriate bias can be determined by considering what CW is: a publication which passes the news and commentary around. Taking our cue from that, let us see how communications were being dealt with both technically and generally in those distant eras.

In the '40s, publication of information, was very selective — basically by word of mouth. At Harvard and MIT, at Manchester University in England and at specialized meeting of various societies, the news of developments in memories, switches and hardware components was passed around, hinted at and carried back to research laboratories. There was no interested user population outside the research labs — and there were no formal publications. The Association for Computing Machinery (ACM) was still only a gleam in Ed Berkeley's eye.

By 1957 the situation was very similar on the surface. The ACM and the Institute of Electrical and Electronics Engineers had emerged. In England, the London Programming Group (later the British Computer Society) was following a similar road of specialized society publication and meetings, supplementing vendor hardware manuals. Word of mouth was still the key distribution method and missing a meeting could be the cardinal sin.

But underneath, just surfacing, were the great communication breakthroughs — computer languages. Fortran already had its name, which it was never to lose. Cobol was there also, called B-Zero for Business Compiler No. 0.

Software's Birth

In an abandoned tire factory at 19th and Allegheny in Philadelphia, Grace Hopper's teams were busy showing that not only could automatic programming (as compilers were then called) but that the same language could be used on more than one machine. Compatibility had reared its ugly head and software was being born.

Technically, as can be seen now, this compatibiity was and is the great communicator. Even the name B-Zero implied that different future languages would be developed, and in the years to come many developments took place. But the lead of B-Zero turned out to be in the number of programs written, rather than in the excellence of specific language gadgets.

In short, it was the communication of programs from machine to machine, from programmer to programmer and from system to user that was paramount, not the ease of writing programs as such.

Communications between users took another advance 15 years ago, although the society meetings were becoming almost entirely vendor-related, in the Share pattern, and the conference meetings were going from strength to strength but not covering the user.

Auerbach at Arch Street in Philadelphia issued its *Standard EDP Reports* giving "apple to apple" comparisons on hardware *and* software on a regular monthly basis. This again gave users an opportunity to communicate in more than a marketing mode.

Still, however, in 1962, the trend was developments by the major hardware vendors. The industry was vendor-segmented, except perhaps during the short time when hardware was being selected. Cobol and Fortran were going from strength to strength and the questions regarding the selection of future languages was being pushed quietly, mainly by monthy magazines headed by *Datamation*.

10 Years Ago

At the time CW was formed, the situation was coming to a head. IBM was readying an efficient PL/1 and would shortly announce the end of support for Cobol. The outside manufacturers were readying their attack on IBM, previously left to leasing companies. Some daring installations were even considering permitting Memorex to test disk packs on their 2311 disk drives.

The communications in the vendor-dominated societies continued rather uncritical and insular, with ordinary members being excluded from conferences that were "not their concern." There was nothing like the current freedom of spirit.

Major developments in packaged software were starting up, with the industry fighting a lack-of-knowledge gap and the problem of reaching its market. But still, matters were on a minute scale compared with today.

In 1967 we could see the importance of language and product communications, but the one area of communications that really has no shadow before CW is ethics. Since '67 the privacy battle has erupted and it has been won against the universal identifying number. There was no sign of that 10 years ago.

Tackling Specific Issues

Priorities are developing addressed to specific issues, rather than to general classes of events. Cobol and Fortran were standardized, but languages in general were not. The use of the Social Security number as an approved single identifier was attacked, but not its use for other purposes. The rules are developing to meet the situation.

We can expect further such developments. Greater use of computers will tend to solidify users' powers and the public's powers, when and if necessary.

Predominantly, over the past 30 years we have pioneered in terms of using automation for traditional business ends, adding optimization routines (such as airline estimated overbooking routines) in only a few situations.

During the next decade I expect the balance between automating traditional methods and incorporating new methods to change, with more and more optimization methods being routinely incorporated. Whether I'm right or wrong, however, we will have to see when CW is 20 years old.

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If Suppliers Act Swiftly

It's Not Too Late to Salvage Software Tax Situation

By Roy N. Freed
Special to Computerworld

From a Legal Viewpoint

Members of the Association of Data Processing Service Organizations and other suppliers in the computer industry who are troubled and confused over the sales tax situation have no one to blame but themselves.

Instead of sitting around for years — ostensibly waiting for the sales tax collectors to promulgate regulations, but actually hoping their existence would be overlooked — they should have been taking the initiative to influence the adoption of a proper approach. They should have been on the offensive all along.

Because of the suppliers' failure by not even trying, sales tax collectors are reaping the benefit of the old divide-and-conquer routine.

It's still not too late for computer industry suppliers of software programs and various services to try to salvage the situation. But they had better act fast and professionally, for once. Here's the course to follow, for anyone who will listen.

First, suppliers must understand the proper legal coverage of the various state sales tax laws. Most cover only transfers of tangible personal property in intrastate transactions. A few cover specified services, such as repair of equipment and general information services.

The statutes prescribe the legal authority of the various sales tax collectors. It is illegal for the tax collectors to claim taxability of transactions not covered by the statutes, and the courts should provide protection against overreaching. As a practical matter, these collectors might collect taxes improperly because no one challenges them in court or because the challenges are inept.

Noting the proper coverage of the laws, suppliers then must recognize the true natures of the wide variety of transactions in the computer industry to see which properly fall under the laws and which escape.

For some strange reason, this seems to be a difficult task for most suppliers. But it's really easy if you just think about it professionally.

For example, what does a supplier of software programs do for its customers? Some sales-tax collectors insist that they merely furnish magnetic tapes and hence transfer tangible items.

More correctly, suppliers normally only license customers to practice trade secret processes for operating computers, similar to processes for refining petroleum or producing chemicals. They might or might not furnish media. Any such media is simply equivalent to a technical manual describing the process.

A supplier which chooses to use copyright protection is, for legal purposes, merely licensing its customers to make copies of a copyrighted work, just as newspapers make copies of copyrighted comic strips. Service bureaus merely perform a service of analyzing and assembling data and create reports as an incidental step, unless they produce mailing labels, form letters and other tangible items desired by the customers for use as such.

Commercial time-sharing suppliers generate electronic signals or impulses to order.

So it goes, all down the range of transactons. Most are not covered by present sales tax laws when carefully analyzed from a legal point of view.

Structure Transactions

Having noted the scopes of the laws and the natures of the transactions, suppliers should structure their transactions to reflect their true natures and their nontaxability, where that is the case. The proper structuring should be reflected in carefully drawn agreement forms.

Those agreement forms should be treated as scenarios to courts and tax collectors to show how the transactions are not taxable. They should use words that convey the message to courts and tax collectors, not the often misleading computer industry words that have cropped up without any careful selection or thought to their legal significance, which often can be adverse.

With all this done, suppliers should be secure enough to take the initiative to tell sales tax collectors which transactions are not taxable and why they are not and to demonstrate they are ready to defend their positions before the courts. The ostrich is vulnerable to a swift kick you-know-where. That's what computer industry suppliers are getting for their defaults.

Computer industry suppliers have tried for too long to be their own lawyers. They should finally recognize the risks in that approach. Even in the few cases in which they succeeded, such as the Tennessee sales tax case and the District of Columbia tangible personal property case, they seem to be unable to formulate and present the legal issues to get well-reasoned court decisions.

In other industries involved with technological change, people take the traditional approach outlined above and find that it works. It's about time that computerniks get wise. The present confusion is largely of their own doing.

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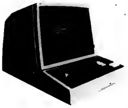

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Reader Commentary

Tennessee Law Taxing Software Violates the Division of Powers

By Robert M. Sherin
Special to Computerworld

In early April, while we were sleeping, a great travesty took place in Tennessee. The governor, Honorable Ray Blanton, signed into law two bills purporting to tax as tangible personal property the same computer software that a recent Tennessee Supreme Court decision had ruled exempt as intangible property.

On June 14, 1976, in a unanimous decision with one justice not participating, the court ruled in the case of Commerce Union Bank vs. George Tidwell: "What is created and sold here is information, and the magnetic tapes which contain this information are only a method of transmitting these intellectual creations from the originator to the user. It is merely incidental that these intangibles are transmitted by way of a reel of tape that is not even retained by the user."

The software as defined in the case, which was found intangible, is precisely what Tennessee will be taxing as tangible personal property. The definition "'software' refers to information and directions loaded into a computer which dictate different functions to be performed by the computer."

Clever Ploy

There is a clever ploy to this action that, if allowed to stand, will set a dangerous precedent and undermine the cornerstone of the software taxation issue in the states, the brilliant victory by counsel for Commerce Union Bank. The basic definition of tangible personal property in Tennessee will have added to it the following: " . . . and it includes punched cards, magnetic tapes, disks or any other device or material used in computer data processing and related services, and also computer software, data or information transferred onto any such physical materials without regard to the means taken or procedure followed in achieving the transfer to them or whether customized or packaged."

Next the Tennessee Legislature might define men as women, women as men, white as black and black as white for the sake of accruing some financial benefit with an utter disregard for etymology and semantics.

Where are the advocates and attorneys with vigilance and proper opposition? Isn't there anyone substantially affected in Tennessee sufficiently moved to petition the Tennessee Supreme Court by way of writ of certiorari — or by other appropriate means — to reverse this obvious violation of the division of powers?

Defaulting Through Inaction

This legislative action, in flagrant violation of a court decision, occurred because we were sleeping — because we again, through inaction, defaulted. Are we going to continue to remain oblivious to taxation without representation?

As reported in *Computerworld* [April 4], the governor's legislative aide, Nelson Biddle, explained: " 'We're familiar with the court cases and the present law' as it is generally construed 'and we're going to test it out.' "

Is there anyone in Tennessee willing to make that test?

Sherin is president of Nova Computing Services, Inc. in Miami, Fla.

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Supplants Rumors, Complaints

'User Satisfaction Index' Rates DP Function Objectively

By Louis Fried
Special to Computerworld

In the final analysis, most top management people apply subjective measures in the evaluation of the performance of the DP function. Given that the average executive has little knowledge of the DP field and bases his opinion on the complaints he hears, this shouldn't be surprising.

The challenge to DP managers is to find a way to structure these subjective appraisals so they more truly reflect the performance being measured.

Several techniques exist for providing objective measurement. These include:

1. *Expenses compared to budget*. Probably the most simple but fairest measure of management performance requires formal documentation of approved budget variances.

2. *Cost absorption through allocation*. This can be an excellent performance evaluation tool if applied in a manner that shows internal rates for computer time or development personnel to be equal to or less than competitive external rates for the same services.

3. *Project completion*. Projects that are successfully completed on time and within the estimated cost provide a clear measure of project control methods.

4. *System downtime*. Charts showing downtime as a percentage of total hours used on the computer provide insight into operations management. These charts should show time lost from hardware failure, software malfunction and user error. Within each of these categories should be included the computer time necessary for recovery from the failure or rerun of the job.

There are several other possible objective measures, but even if all these show positive results, the DP function may still be considered unfavorably. (And the results of these reports may be considered as propaganda.)

Reader Commentary

Two approaches can be used to convert subjective impressions to a more objective mode. Both require good management and substantial courage.

The first of these is to invite an external auditor to review the operation of the DP function. If this is done by the DP manager, even an unfavorable report can turn into a powerful tool for obtaining the budget and resources to correct the problems.

For the second, I propose the application of a well known consumer satisfaction rating concept for quantifying and reporting to management the subjective responses of users.

When you buy a refrigerator or other appliance, for example, you will find a post card enclosed with the instruction manual. Frequently, this card is used to convey ownership information for warranty purposes.

In addition, you are asked to check responses to certain questions, such as: "Was the appliance delivered on time?" "Was the appliance unpacked and installed by the delivery personnel?" "Were delivery personnel courteous?" "Have you previously owned appliances of the same manufacturer?"

These responses are collated to develop a "consumer satisfaction index." The index can be used to determine any performance problems in the marketing and consumer relations areas.

This concept can be applied to internal DP activity in the following manner. Administered by an independent person within the company, a questionnaire would be designed to create an objective measure of DP performance from an analysis of the subjective responses of users. The user would rate each of the following questions on a scale from 1 (unfavorable) to 5 (favorable).

The total of the responses divided by the number of questions would give a quantified measure of attitude. The individual question responses could highlight areas of weakness.

Some of the questions should be:

- Is response to emergencies timely and effective?
- Is response to new project requests timely?
- Are DP personnel cooperative with users?
- Do technical personnel understand user problems?
- Do technical personnel coordinate with all users impacted by a system?
- Are technical personnel considered professional and capable?
- Are DP plans and systems compatible with corporate divisional plans?
- Are projects fully completed to your satisfaction (including training, manuals, forms, etc.)
- Do projects attain the objectives specified in proposals?
- How do you evaluate the credibility of the DP function?
- Are required reports delivered on time?
- Are system inputs and outputs well controlled?

The responses can be further analyzed by adding and averaging all responses by question to show areas of strength and weakness for all users combined, thus offsetting the effects of individual deviations.

The resulting tabulations can provide management with some basis better than rumor for subjective evaluation. In addition, the manager can gain valuable insights in areas where work is needed.

Fried is a consultant in Palo Alto, Calif.

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ICCP Game Rolling on Its Own; DPMA, ACM Want Marbles Back

By Kenniston W. Lord Jr.

Special to Computerworld

In the minutes of the Feb. 17 meeting of the Executive Council of the Data Processing Management Association (DPMA), there is a brief paragraph indicating the Executive Council voted not to forgive the loan outstanding to the Institute for Certification of Computer Professionals (ICCP). And news has arrived that the Association for Computing Machinery (ACM) has taken a similar action by voting to "hold up" on forgiving the loan.

This would not be notable except for the review of ICCP history.

Scene 1: 1973

In its early meetings, the ICCP (then known as the Computer Foundation) struggled to obtain sufficient operating capital. Such heady things as voting rights were "hammered out."

Once done, the subject of member assessments was advanced by both the DPMA and ACM representatives. These two organizations, with a combined membership of about 50,000 members, could well afford to provide the organizational capital. But a position, once adopted, had to be applied uniformly.

The smaller societies with limited funds and limited incomes were understandably hesitant about providing organizational capital for, frankly, there was little to be had. ACM and DPMA representatives were highly critical of the fact that the smaller societies just didn't have the money to provide a large amount of incorporation capital.

Having been a part of those negotiations, this author can well remember the scorn afforded to the "have-nots" by the "haves." The action was seen as a way to freeze out the smaller groups after having fought valiantly to become a working part of the process; the reader will recall that it was the intent of both the ACM and the DPMA to have formed the Computer Foundation solely as the operation of the two parties.

Finally, after considerable negotiation, a compromise was forged, one which would provide a yearly assessment of $600 plus 10 cents per member. These funds were within the capabilities of the smaller groups, and those groups eagerly supported the plan.

Although "loan agreements" were executed, it was implied, and fully understood by all ICCP representatives, that for all intents and purposes the money was "seed capital" and would not be returned.

Scene 2: 1976

The ICCP board of directors voted to request that all member societies cancel the loan debt or, if you will, to "forgive the loan." The resolution passed unanimously. First to forgive the loan was the Society of Certified Data Processors (SCDP); the next was the Association of Computer Programmers and Analysts (Acpa).

In its first three years of operation, the member societies underwrote the operation of ICCP. From review of financial data, the ICCP was now self-sufficient.

Scene 3: 1977

As of this writing it is known that the Canadian Information Processing Society, SCDP and Acpa have voted to cancel the debt.

On the other hand, ACM and DPMA, which wanted the support commitment in the first place, have not done so, and at least the latter is on record as voting against forgiving the debt.

Perhaps "good business" would require ICCP to repay its incorporation capital. But the smaller society representatives have realized what the larger ones have failed to realize — that it would severely hamper the growth and development of ICCP plans and programs for additional tests, new products and the like.

If the ICCP is to repay DPMA and ACM, it should most certainly pay all other of its constituents, despite their willingness to forgive the debt.

. . . And in This Corner

It was important, when the ICCP was formed, that ACM and DPMA control the show.

But DPMA and ACM are no longer in control of the ICCP — though the former is represented on the board of directors. What has happened now looks painfully obvious. DPMA and ACM are no longer running the game, so they want their marbles back.

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'Total' Now on Interdata CPUs

CINCINNATI — Cincom Systems, Inc. has developed a version of its Total data base management system for Interdata, Inc. 32-bit minicomputers which it said offers the same capabilities available with all other versions of the product.

Data relationships under Total can be created in either network or hierarchical structures with significant reduction of data redundancies and more efficient use of disk space, Cincom said. Total's concept of data independence frees the applications programmer from concern about data base change, a spokesman claimed.

With the introduction of an Interdata version, Total is currently available for hardware from 14 different vendors and is capable of executing in 40 different operating system environments, the company noted.

Interdata CPUs supported include both the 7/32 and the 8/32 under OS/32. The Total-managed data base can be accessed from Cobol, Fortran, CAL or any other language with a CALL or Exit facility.

Interdata Total will be available in June in a basic version, followed by a compatible central version during the fourth quarter of the year. The basic version costs $13,500 while the more complex central version will cost $16,500, Cincom said from 2300 Montana Ave., Cincinnati, Ohio 45211.

'RACF' Security Features Extended to Include Tape

WHITE PLAINS, N.Y. — The Resource Access Control Facility (RACF) software, introduced by IBM last summer as a security measure for disk-using OS/VS sites [CW, Aug. 2], has been extended to protect data stored on magnetic tape as well, the company said.

RACF allows installations under OS/MVS to limit individual users' access to just those areas in a system required to do their jobs. Used in batch mode or under TSO, the package checks user identification, authorizes — or rejects — requests for access and logs all requests, whether granted or refused, onto an audit tape for later analysis, IBM said.

In addition to protecting tapes, Release 2 of RACF was designed to support operator identification through use of magnetically striped plastic cards, to offer improved audit controls and to simplify use of the protection provided by the software, according to the company.

With this release, scheduled for delivery in August, operator identity can be verified on IBM 3270, 3770 or 3767 units through a device that reads the magnetically coded stripe on the back of specially issued plastic cards.

The audit functions under Release 2 are said to include an ability to log all RACF file changes so modifications to the basic parameters of the security system are recorded along with the identities of the operator and the terminal used to make the changes.

Other enhancements include the use of JCL statements to define the disk data sets and tape volumes under RACF protection. Previously, the installation was required to establish program profiles to define such protected files, a spokesman said.

Release 2 also allows RACF system options — which terminals to protect, for example — to be changed without shutting down the program, as the first release requires.

RACF can be used on any IBM 370/145 or larger CPU running under MVS. Release 2 will be available under a license agreement at a monthly charge of $875, the same cost as for the first release.

Run-Time Exec Replaces DEC Software

W. CALDWELL, N.J. — A run-time system package developed by Information Access Systems, Inc. (IAS) for users of the Datasystem 300 family from Digital Equipment Corp. supports faster throughput, easier program development and more terminals than DEC's software, the software house claimed.

The IAS package uses a virtual memory concept similar to the one used by DEC's RSTS/E (without that system's large supervisor), even while taking advantage of the reentrant code program generated by Dibol but not often used by DEC's smaller systems, IAS said.

The reentrant code allows a single copy of a program to be loaded into the system regardless of how many users are working with it. The virtual memory support limits the residency of even that one copy to just those portions required by the individual users, a spokesman noted.

Before it developed its own run-time system, IAS had problems running Dibol for two terminals on a 56K-byte configuration; with the software in place "it's not a problem to run four" terminals now.

Still under development but scheduled to be part of the package when it is ready is a multiterminal program development system, which was designed to allow development work to be run from "any and all" terminals concurrently with production work.

Under DEC's software, IAS said, program development work can only be done by one terminal at a time.

The package, including the development support (expected to be ready in June), costs $3,000, IAS said from 1140 Bloomfield Ave., W. Caldwell, N.J. 07006.

Query 5 Gets File Update Aid

BURLINGTON, Mass. — Interactive input, update and examination of sequential disk files on Burroughs, Honeywell or IBM CPUs is provided by the Q5UPDT package now available from Azrex, Inc., according to a spokesman.

The software supports the use of English and works under control of an internal dictionary that describes the format of files and the fields in their records. The module can be used as a stand-alone system or as an extension of the Azrex interactive Query language (Query 5), he added.

Q5UPDT enables the user to interpret and work with binary, numeric or alphanumeric fields, to perform decimal point alignment for mathematical operations and to work with signed fields.

The package supports the selection of specific records or sets of records; once selected, fields or records can be listed, changed or deleted based on multiple conditions specified by the user.

Q5UPDT runs on IBM 360/370 equipment under TSO, on Burroughs B4700 to B6700 mainframes or Honeywell 2000 or 6000 CPUs.

The software costs $4,995, Azrex said from 3 Mountain Road, Burlington, Mass. 01803.

'TSO/MON' Adapted To MVS Environment

ARLINGTON, Va. — The TSO/MON software package developed by Morino Associates, Inc. to monitor and control the use of IBM's Time Sharing Option has now been adapted for use in an MVS.

The product collects performance and utilization information at the system and user level and writes this information to SMF.

TSO/MON-MVS supports Release 3.7 of MVS and Selectable Unit 7, Supervisor 2; it is available under license for $9,000, Morino said from Suite 101, 1401 Wilson Blvd., Arlington, Va. 22209.

'Multi-Maint' Eases DOS Usage

BROOKFIELD, Conn. — The Multi-Maint package from Universal Software, Inc. is said to provide operational flexibility and improved scheduling procedures to IBM DOS users by allowing the LNKEDT and MAINT programs to catalog and update the system libraries from any partition at any time.

The LNKEDT facility of Multi-Maint supports cataloging to the system or core image libraries from any partition. It also allows linking and cataloging to a private core image library that can be assigned across partitions, Universal said.

The MAINT capability of the package supports all maintenance functions — except core image library condense — to the system or private core image and relocatable and source statement libraries from any partition, a spokesman added.

This feature offers the flexibility to catalog or update a module, source hook or procedure in any partition prior to processing a test or production job stream.

A DEQ/ENQ facility used by Multi-Maint allows LNKEDT and MAINT runs to take place concurrently in multiple partitions.

The Universal package can be used with any IBM 360/370 operating under DOS. It rents for $75/mo, the company said from Brookfield Office Park, Brookfield, Conn. 06804.

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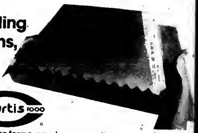

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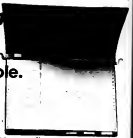

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DG Adds Business Basic Package For Both Nova and Eclipse Users

WESTBORO, Mass. — A multiuser Business Basic language package introduced by Data General Corp. was designed for easy business-oriented DP on all Nova and Eclipse CPUs operating under the Real-Time Disk Operating System (RDOS), according to the firm.

Derived from the same research that provided the Extended Basic already available to RDOS users, the Business Basic package is said to include further extensions and modifications of the language to make it useful in the business environment.

Multikey indexed sequential file structures, file maintenance and file security, for example, are supported by the software. A double-precision integer arithmetic facility maintains accuracy to more than 21 million and eliminates the rounding problem of floating-point arithmetic, a spokeswoman added.

Print formatting statements allow output to be right- or left-justified, filled with specified characters or truncated. Other statements handle decimal point insertion, fixed or floating dollar signs and suppression of leading zeroes, the firm said.

Data can be passed between programs through direct block I/O, using a common area. Multiple tree-structured indexes may have access to the same data file. Records are allocated to disk dynamically and both data files and their indexes have LOCK/UNLOCK protection, the spokeswoman noted.

Among the utilities provided with the Business Basic package are a fast sort — which can only put items in ascending Ascii sequence — and a slower sort, which has more flexible capabilities, she said.

The Business Basic package requires a 64K-byte main memory, a real-time clock and 10M bytes of disk storage. It can be installed with one year of support for $4,000; subsequent installations within the same organization cost $1,800.

An optional interface to DG's Infos environment requires an Eclipse C/300 or C/330 with 128K bytes of memory, a real-time clock, 10M bytes of disk and a 9-track tape subsystem. The interface costs $1,000, DG said from its offices on Rt. 9, Westboro, Mass. 01581.

Software Engineers Plan May Conference

WASHINGTON, D.C. — The First Eastern Regional Conference of the Institute for Software Engineering will be held May 31-June 1 in Falls Church, Va., a Washington suburb, and will feature reports from member organizations on their efforts in capacity management and the application of software physics.

The conference will be chaired by Mike Morris of the General Accounting Office here and is open to the public as well as members of the institute. The institute is a technical trade association for computer installations which conducts development projects and disseminates the results of the projects, Morris said.

The institute also conducts courses, workshops and conferences such as the one being announced now and provides direct assistance to members in their attempts to make their operations more efficient, he added.

The Eastern Regional Conference will be held at the Ramada Inn at Tyson's Corner, 7801 Leesburg Pike in Falls Church, and registration fees, which include a copy of the conference record, are $35 for institute members and $60 for nonmembers.

Further information is available from Don Madden at the Institute for Software Engineering, P.O. Box 637, Palo Alto, Calif. 94302.

MSA Modifies 'GL/Fics' To Run on HIS CPUs

ATLANTA — The General Ledger/Financial Information and Control System (GL/Fics) software from Management Science America (MSA) is now available for use on Honeywell Information Systems, Inc. Series 60/Level 66 and Series 6000 CPUs using HIS' latest Cobol compiler, MSA said.

Written in ANS Cobol, GL/Fics is modular in design; its five subsystems can be used individually or in concert with one another.

The software costs $30,000 to $70,000 depending on the modules selected, a spokesman said from MSA's offices at Suite 1300, 3445 Peachtree Road, N.E., Atlanta, Ga. 30326.

Adabas Update Released

RESTON, Va. — Version 3.2.1 of Adabas, the data base management system from Software AG, includes enhanced capabilities for the end user, the applications programmer and the data base administrator, according to the vendor.

For the non-DP-oriented end user, the release includes Adascript+, an updated inquiry and reporting language and an enhanced version of Adawriter, the Adabas report writer.

Adascript+ runs on-line or in batch mode and provides a number of features for formatting output. In addition, a macro capability is provided so the user can tailor the language to a particular environment, a spokesman noted.

Adawriter has been extended to include the IF statement for selective execution of computation clauses and selection using sub-, super- and phonetic descriptor fields in addition to the normal descriptors allowed with the earlier versions.

The update also supports use of non-Adabas files and stacking of reports in a single Adawriter run, the spokesman said.

For the applications programmer, Version 3.2.1 includes an option for unique record number management on Find commands and a range of commands to work with those unique numbers.

On-line running of the Adabas utilities to create or modify the data base, partial mounting of portions of the data base and a decompression utility to create a standard sequential file from a data base are among the supports provided for the data base administrator with the release, Software AG said.

The system is available for IBM OS and OS/VS users and costs $120,000, the company said from 11800 Sunrise-Valley Drive, Reston, Va. 22091.

Teaching your computer to count cornflakes, cookies and whoppers.

A special report on *Source Data Entry* in the May 30th *Computerworld.*

A great deal of attention and effort has been directed toward automating the data entry process over the years. And it's easy to see why. The usefulness of your entire computer system is inextricably linked to the speed and reliability with which you convert raw data to machine-readable form. *Computerworld's* May 30th special report will be looking at just how far we've come with data entry — and, possibly, where we're going.

Edited by Frank Vaughan, this report will take a comprehensive look at source data entry methods, including:

- Places it's commonly used — supermarket check outs, airline reservation systems, hamburger stands, etc.
- A survey of contemporary equipment — scanners, POS registers, badge readers, mag stripe readers, key-tape and key-disk systems, the newer hybrid systems, and the emerging technology of voice data entry.
- An evaluation of the impact distributed data processing (DDP) is having on distributed data entry (DDE) — do these approaches dovetail or does DDP diminish the use of DDE? Are large scale, centralized data entry sites becoming obsolete?
- The state of the art — equipment speeds and technical trade-offs. Innovative applications like voice input and using the telephone as a terminal.
- What's ahead — Input from smaller users just getting into computer automation through data entry; e.g., how merchants regard the costs, projected savings, and their need for automated data entry methods. Possible impact on consumers.

If you're a DP manager, supervisor, or corporate manager who's concerned with the cost effectiveness of DP, be sure you read the special report on Source Data Entry in the May 30th *Computerworld.* If you manufacture and market data entry equipment you'll want to advertise here. Don't miss the May 13th ad closing date. Contact your *Computerworld* salesman — or call Terry Williams at (617) 965-5800.

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Physical Handicaps Overcome by Programmer Trainees

By Drew Bourrut
And Herb Alter
Special to Computerworld

Articles have appeared in trade publications recently, describing experimental programs to train physically handicapped people as programmers. We conducted a successful training program in 1975 and the people who participated are working as commercial programmers today.

Our client asked us to use the same techniques and procedures we had used in the past in order to turn handicapped people with no previous computer experience into "superprogrammers." In 12 weeks, we would try to produce programmers who could work in Assembler language and ANS Cobol at levels usually attained by others after a year and a half or two years on the job.

While the course started in 1975, the need for it arose in 1973. The Rehabilitation Act of 1973 prohibits discrimination in employment because of physical or mental handicaps.

Working closely with our client, we developed a plan to teach our usual entry-level training course at the Human Resources Center in Albertson, N.Y. This nonprofit organization provides education, training and placement for physically disabled and educably retarded workers and offered us an environment without architectural or attitudinal barriers in which to do our training.

We thought our students' handicaps might produce some problems which we couldn't foresee and we knew the people at the center could help us solve them. They could also locate prospective candidates for the program from their files and through affiliations with other organizations and schools.

We wanted to create the most practicable programming environment for our students. We made arrangements for batch testing at a local service bureau and for the installation of four TSO terminals to be connected to our client's IBM 370/158.

The first segment was designed to bring all our students to approximately the same starting point. We taught introductory material about hardware and software, data processing and programming logic. Additional information in these areas was woven through the entire course.

The Human Connection

Once we covered the principles of Assembler and Cobol, our students wrote several programs in each language. We stressed program structure and logic throughout the course.

Since our students were heading for an OS installation, we taught them the various file organizations and access methods supported by 370 hardware and the operating system. Additionally, we covered OS utility and service programs.

We also taught them JCL and TSO so they could work in both batch and interactive environments.

The last two weeks of the course were intended to simulate a real work environment. Our students were assigned average real-world problems — they were required to code three program modules, their own test data and all the JCL needed for testing.

Our students' ability to use a combination of much of the material covered in the course and to produce a working program on schedule was a real test of the success of their training.

While various versions of this course had been taught before, during this presentation we encountered — and solved — various problems unique to handicapped students.

We made sure furniture was available which could be used by people in wheelchairs — they had to be able to get close enough to work areas to use them comfortably. The TSO terminal tables, for example, had to be higher than usual.

Since one of our students was legally blind, we reduced our dependence on auxiliary visual equipment. We prepared handouts to correspond to our blackboard presentations and relegated our overhead projector to the storage closet.

Some of our planning dealt with details as minor as providing an electric pencil sharpener for students with motor coordination difficulties.

Some of our students had problems directly relating to their physical disabilities. For example, one student with motor coordination difficulties could write, but only very slowly. Since a programmer only spends a small portion of his time actually writing code, this would not be a problem once he was on the job. In a classroom situation, however, writing is nearly a full-time activity and this affected his ability to keep up with the work.

We were able to provide some assistance by supplying copies of class notes. Once the TSO terminals were operational, we discovered this student was able to type; this solved his problem because he no longer had to write in the little boxes on the coding sheets.

In reviewing the course, we realize we faced many problems. None of them went unsolved.

In addition, we learned some people have serious physical disabilities but are handicapped in only a minor way.

Bourrut is president of Bourrut Consulting Corp. in Smithtown, N.Y. Alter recently formed his own company, Alter Associates of New York City.

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N.Y. Center Finds 'Slick' Way To Ease Source Program Chores

NEW YORK — Many data centers use a number of utility packages from outside vendors, while some — like the center connected with a very specialized health care organization here — use only one but couldn't function well without it.

The Community Blood Council of Greater New York, Inc. supplies blood and blood products to hospitals in the greater New York area, including the city, most of Long Island, parts of New Jersey and sections of upstate New York.

It utilizes a computer system based on a 128K IBM 370/125 under DOS/VS to maintain records of those people who have donated blood and are covered under donor group plans. The council notifies the leaders of the groups when donations have been made and what their new quotas are, DP manager Michael Hart explained.

Blood usage is also reported to the council's own management, Hart noted, presumably so that recruiting drives can be started before needs become critical.

Even though donations are voluntary, the council charges hospitals the cost of processing any blood or blood products it supplies. So there is a billing system with charges invoiced as blood or constituent products are shipped. The system also enters credits if any products are returned to the council. This usually happens when a product is not used before a generally agreed upon freshness date.

Mostly Financial Work

Basically, Hart and his staff of 11 in systems and programming and 23 in operations are doing financial work. This includes some quite conventional ledger work, but also some accounting for grants the council has received from the National Institutes of Health.

When Hart joined the council more than a year ago, he found programs written in any of three languages — Assembler, Cobol or RPG — with little or no effort to standardize how the source decks were protected and used.

The council was using a source statement library which stored programs on disk, but it accepted source statements in only one form and was used to support Cobol, Hart said.

Assembler had to be put up in a different way, he added, and RPG was not supported at all. Clearly there was a need for a standardized way of handling this part of the DP operation.

Hart considered a number of packages. He talked with members of his staff who had had experience with Panvalet from Pansophic Systems and with The Librarian from Applied Data Research (ADR). He came away with the feeling that they and Slick from National Computing Industries were equally good technically.

He finally selected Slick, primarily because it cost quite a bit less than the others. Hart recognized that both Pansophic and ADR would send someone to train his people, but felt he could do the job himself and save some money.

In fact, the documentation that came with Slick was so good, in Hart's experience, that he and his staff were able to install the package over three days' time.

Slick has been in use for about a year and the council's DP center runs 21 hours a day, five days a week, so Hart and his crew have had plenty of time to exercise the system. Talking about the software recently, he couldn't recall any difficulties with it during that time.

Dairy Firm Picks CICS

By Ronald A. Frank
Of the CW Staff

ST. PAUL, Minn. — If teleprocessing software is planned carefully and implemented in a phased approach, a user will minimize his problems, according to James McLaughlin, project leader at Land O' Lakes, Inc., a dairy products firm.

McLaughlin described his experiences in implementing IBM's Customer Information Control System (CICS) which began in 1972 for order processing.

In the course of working with CICS, Land O'Lakes moved from a 370/135 to a 145 and then to a 158, which is now in operation. The system is now working under DOS. However, during the summer, plans call for shifting to OS, he said.

CICS was chosen because the company already had IBM hardware and it provided a uniform upgrade path not available with all independent teleprocessing monitors.

Extensive in-house development work has been done on CICS and McLaughlin estimated there were 10- to 15 man-years invested with the software currently worth about $500,000.

Among the enhancements written for CICS was a recovery/restart routine and a routine for continuing a print run at a remote terminal after an interruption.

The Land O' Lakes network serves about 70 terminals at 25 sites, most of which are located within 300 miles in Minneapolis, McLaughlin said.

Most of the terminals in the net are "dumb" devices and this added some software problems, he indicated. The equipment includes IBM 3270s, 3773s, Western Union Data Services' EDT 300 display terminals and Teletype Corp. Models 33 and 35 teletypewriters.

The introduction of CICS made it possible to have multiple terminals operating across multiple applications instead of requiring one terminal to be dedicated to a single application.

Point-to-point, multidrop private lines and dial-up facilities are used in the network, which operates for eight hours daily with a 95% availability, McLaughlin said.

Metropolitan Data on Two Nets

BALA CYNWYD, Pa. — The Chase Metro Data Base, said to be a complete source of economic information for all 260 metropolitan areas in the U.S., has been installed on two national time-sharing systems, according to the developer, Chase Econometric Associates, Inc.

The data base includes approximately 16,000 statistical series, grouped under the following headings: housing, personal income, industry, employment, department store sales and consumer price indexes.

Through the facilities of the time-sharing vendors, the data is kept current by Chase and available on command by the user. Updates are made daily so that even if metropolitan boundaries change, the data will be revised to be consistent with the new boundaries, he added.

The data base is currently available nationwide on the networks supported by Waltham, Mass.-based Interactive Data Corp. and by Ann Arbor, Mich.-based ADP Network Services.

Chase Econometrics is at 555 City Line Ave., Bala Cynwyd, Pa. 19004.

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CW 5167

Arpanet DBMS Uses Decsystem-10, Mass Memory

CAMBRIDGE, Mass. — The Datacomputer, said to be a new type of data base management system (DBMS), has been developed by Computer Corp. of America (CCA) under contract to the Advanced Research Projects Agency (Arpa) of the Department of Defense.

The system is dedicated to the data management needs of a network of computers and offers access to a mass memory.

Files in the trillion-bit range may be accessed within seconds, a previously impossible or impractical task using standard disk or tape technology, CCA claimed.

The Datacomputer caps a research and development effort at CCA involving approximately 70 man-years. Service has been available on experimental releases of the system since August 1973, and the full system with a mass memory has been operational since October 1976.

Currently the utilized portion of the mass memory is approximately 120G bits or the equivalent of 150 IBM 3330 disks, CCA said.

The Datacomputer is a network data utility: it is a node dedicated to providing data base management services to other computers on the network.

All communication between the Datacomputer and user programs running on these distant machines is handled through the high-level Datalanguage, according to the firm.

The Datacomputer processor is a Digital Equipment Corp. Decsystem-10 which currently interfaces to an Ampex Corp. Terabit memory with a maximum on-line capacity of 3.2 trillion bits.,

The use of mass memory allows very large data bases to be kept on-line and also offers very inexpensive storage for small- and large users alike, CCA said. Effective access to very large data bases is achieved through the use of inverted files and staging strategies.

The Datacomputer will access only the selected portions of large data bases on the mass memory and stage them to faster disk devices for repeated reference.

The Datacomputer is particularly useful for sharing of data among dissimilar machines in a network environment, CCA noted. The system converts data types to match the convention of each machine in the net.

Major Applications

Applications using the Datacomputer include the collection, storage and processing of seismic waveform information as measured by instruments installed throughout the world.

Approximately 20G bits of seismic data are being stored on the Datacomputer per month. This is one of the largest scientific data bases ever assembled, CCA said.

Straightforward bulk data storage and retrieval is another major application of the Datacomputer. Many users alleviate local storage problems by archiving files to the Datacomputer. CCA has developed a simple, terminal-oriented Datacomputer File Transfer Program to facilitate archiving.

One large version of the Datacomputer offers service on Arpanet. The Datacomputer is available to government installations and other organizations with access to the Arpanet..

Other versions of the Datacomputer can be installed on standard Decsystem-10s and -20s, CCA said.

For additional information contact Dr. James Rothnie, CCA, 575 Technology Square, Cambridge, Mass. 02139.

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Hospital Manages Mailing Problems

By Donald G. Neault
And Stephen L. Priest
Special to Computerworld

BROCKTON, Mass. — Have you ever been mailed multiple copies of an announcement of an upcoming meeting or other event? Most of us have, only to be annoyed by the excess, even if we're interested in the subject of the notice.

Concepts and Techniques

The Brockton Hospital, a 322-bed nonprofit general hospital here, has developed a computerized system which will minimize duplicate mailings to its many audiences.

The system prints labels in Zip Code sequence according to specified categories of individuals or organizations. It also prints alphabetical listings of the entire master file and individual categories.

The lists provide the monitoring department with a means of auditing the information stored on the master file.

The master file contains one record per individual. Each record consists of a check-digit sequence number, the name of the individual or organization and the capability of storing up to two complete addresses and three salutations. Each address and salutation is assigned a reference code to be used in conjunction with the category.

A category is a group of individuals or organizations that have a common denominator (i.e., retired employees, hospitals, media, etc.). Each category has also been assigned a reference number.

This allows the hospital to match a specific salutation to a specific address for a specific mailing purpose. For example, Dr. John Smith is a member of the hospital's medical staff; his wife, Caroline, belongs to the hospital's women'sauxiliary. As such, they are listed as Dr. and Mrs. for community mailing purposes.

Medical staff mailings are sent to Dr. John Smith at his office address. Auxiliary announcements are sent to Mrs. John Smith at her residential address. The hospital's bimonthly publication is sent to Dr. and Mrs. John Smith at their residential address.

The system, thus, offers use of two addresses, three salutations and three categories,.but requires only one record on the master file.

File maintenance procedures allow any individual or organization to be added to or deleted from the file or any piece of information to be deleted or changed.

An extensive edit system has been built into the front-end and update programs to ensure that input is reasonable. The update program produces a report with control totals showing the number of changes processed and errors caught.

Mailing labels, printed in Zip Code sequence, can be produced for the entire master file or for particular categories. Options exist for printing the labels one-, two- or three- up and for printing multiple copies.

Neault is a programmer/analyst and Priest is manager of data systems at Brockton Hospital, Brockton, Mass.

Two Services Available

SPC Revives Datran's Circuit-Switched Digital Net

By John P. Hebert
Of the CW Staff

BURLINGAME, Calif. — Southern Pacific Communications Co. (SPC) has revived the circuit-switched digital data channel services of the now-defunct Data Transmission Co. (Datran) for data communications users.

SPC's Datran data services, dubbed "Datadial," were tariffed by the Federal Communications Commission earlier this year and began serving its first user, the Mattell Toys division of Mattel, Inc. on April 29, according to an SPC spokesman.

The specialized common carrier, he said, kept the facilities acquired from Datran last October operational [CW, Oct. 25].

Although Datadial users can save 40% or more compared with other available communications services, a typical savings of 25% can be achieved, he added.

Datadial is available in 18 U.S. cities ranging from San Francisco to Houston, up to Chicago and eastward to Washington, D.C., and Boston, SPC said.

It is said to be a cost-effective, improved performance alternative to applications served by Bell 208B dial modems, such as remote job entry or bulk data transfer.

Two Datadial services are available. Datadial I is usage-sensitive, regardless of distance, and intended for low-volume users.

The second service, Datadial II, is a usage- and distance-sensitive service designed for large-volume users who can expect a minimum usage of 240 network hours, SPC said.

Both services are offered to users at standard charges within a 40-mile radius from the network's nodal cities, which is called the Local Distribution Area, the carrier said.

Occasional Use Connectivity

Datadial I gives the user occasional use connectivity, thus eliminating the need for private line service, the spokesman noted.

Transmission services are available at transmission speeds of 2,400-, 4,800- and 9,600 bit/sec. Billing is timed in 1-sec increments with a minimum charge of 6 sec/call, SPC said.

Rates are determined by five usage categories and also according to the transmission speed used.

Features of the digital switched service include nonexistent clear-to-send times, an average call setup time of .8 sec and full-duplex circuits, SPC claimed.

The service also features automatic blocking of unauthorized calls, automatic circuit testing during call setup, loop-back testing and selective automatic collect calls, the carrier said.

Most of these features, it added, are not offered by Bell System companies.

Datalink Equipment

The Datadial I Datalink equipment and access channel charges are also determined by the transmission speed chosen by the user.

Datalink is the equipment required by the user to connect to the Datadial. It consists of a communications controller and

(Continued on Page 36)

Nodes Manage Net Independently

DNS Could Signal New Approach to Teleprocessing

By Ronald A. Frank
Of the CW Staff

ST. PAUL, Minn. — Distributed Network Systems (DNS) describes a new, basic architectural approach to teleprocessing for a free-standing data communications system, according to Robert M. Price, president of systems, services and marketing at Control Data Corp.

Speaking at a Caravan session here recently, Price said that under the DNS concept, all network terminals are interfaced and managed by the system itself, and this network management is performed within each node as an independent function.

DNS is "applications transparent" and applies its own standard intranetwork protocol to maintain efficient intranodal communications, Price said.

Although CDC has not introduced the DNS concept, Price described it in general terms and a spokesman indicated the concept will be part of a further announcement soon.

Under DNS, computing resource channels are interfaced in a fashion often referred to as "emulative" or compatible with the channel characteristics of the computing resource.

This will minimize software impact to the connecting computer resource, Price said.

Radial-Type Nets

Today's users are mostly involved with radial-type teleprocessing networks that employ decentralized data entry, display devices, concentrators, etc. These nets all rely on central communications management to achieve effective resource utilization, Price said.

This type of network structure begins with a module of the operating system which provides a common communications interface for all applications programs. CDC calls this the Network Access Method or NAM.

The network element in this type of system that allows for flexibility and growth is the front-end subsystem.

In the case of CDC, the front end is programmable to allow for migration to more complex networks, Price said. This type of radial architecture for networks "appears to meet the needs of most users . . . for the next five to 10 years," he stated.

Variation Approaches

A variation of the radial approach is the multihost (multivendor) network which allows multiple systems of a variety of types to share the network resource.

In this configuration, the network is still managed from the host CPU. The need for these multihost nets is now limited to only the very large user, Price said.

The DNS network would introduce

(Continued on Page 34)

HP 2026 Dedicated to Data Entry Transmission

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a small computer system dedicated solely to data entry and communications tasks which it said can double data throughput on dial-up or leased lines.

The HP 2026 system allows entering and transmitting of office information to another 2026 system or computer systems working under IBM 2780 or Hasp communications protocols, according to a company spokesman.

Applications are expected in large organizations which centrally process data entered at remote locations, he said.

The basic 2026 consists of an HP 21MX Series E processor with 32K bytes of main semiconductor memory, an HP 7905A 15M-byte disk drive, an HP 2645A microprocessor-controlled CRT terminal and a desk-style enclosure.

Up to 16 of the 2645As or other CRT or printer terminals can be connected to the 2026 system, he added. In addition, the system's disk capacity can be increased to 120M bytes, he said.

Data Compression Routine

Communicating with one another, HP 2026 systems can effectively double the transmission rates of the interconnecting common carrier modems by applying a proprietary data compression/expansion routine, according to the firm.

Depending on the data inputted, the system halves the number of data characters transmitted, HP claimed, adding it works with all types of binary communications routines.

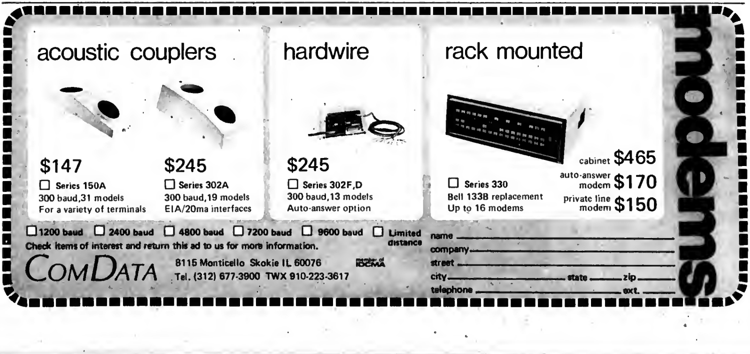
HP, which reportedly has been using the system's technique in a worldwide network for more than six years, has achieved a 50% compression of general office information, the spokesman noted.

HP 2026 Communications System

Communications between two systems employs a line protocol that uses the reverse secondary channel for error signaling, eliminating line turnaround and the wait for propagation delay, HP said.

Communications from the remote 2026 to

(Continued on Page 36)



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Buzzwords Become Reality – Part 2

Bank Network Utilizes Nonstop Processing Techniques

This is the second article in a two-part series detailing the banking services network of the First National Bank of Lincoln, Neb., which will interface a statewide banking communications switch scheduled for operation in July.

The first article discussed the equipment and capabilities of the network.

By James Cody

Special to Computerworld

The First National Bank of Lincoln, Neb., which provides on-line services to the Nebraska banking community, is building its network around concepts that are only buzzwords for many communications users.

Protocol transparency, nonstop computing, front-ending, back-ending, shadowed data bases and multiprocessor applications are concepts which First National is implementing on a variety of mainframes, minicomputers and microprocessors.

Front-end communications processing will be accomplished on two Tandem Computers, Inc. computers which will switch messages between four types of sources and destinations.

These are all of the terminals in First National's network, the dual Burroughs Corp. B4700s, the Tandem back-end processors and the Nebraska Electronic Transfer System (Nets) computer which is scheduled to begin operation as a statewide interbank electronic funds transfer switch in July.

Front-end software will utilize nonstop programming techniques to allow the primary and secondary processors to accomplish front-end functions in parallel to provide immediate recovery in the event of processor or peripheral failures.

The initial line configuration includes 32 asynchronous ports ranging from 4,800- to 19,200 bit/sec and 24 synchronous ports ranging from 4,800-to 50,000 bit/sec.

Back Ends

Back-end financial transaction processing is also designed to operate in nonstop mode, wherein parallel software systems will run on primary and secondary processors.

The three processors are nominally configured as follows: one primary front-end, one primary back end and one secondary system for both front-end and back-end functions.

The architecture of the Tandem multiprocessor systems, however, permits graceful degradation down to a single processor if equipment failures occur.

The back-end systems will maintain a complete financial data base to enable all electronic funds transfer (EFT) system and on-line accounting transactions to be processed in the nonstop computing environment.

These transactions can originate from CRT terminals, manned teller terminals, unmanned automatic teller machines (ATM) and point-of-sale terminals.

All terminal-dependent transaction logic as well as financial accounting logic will be resident on the Tandem systems.

A unique feature of the systems' data base software is the ability to create and maintain disk volumes in shadow-recording mode.

This means that each customer's account will be simultaneously maintained in two places as an added safeguard against equipment failure.

The systems are configured with two complete disk subsystems, each of which consists of multiple disk drives.

Identical, shadow-recorded volumes will be maintained on each subsystem for the financial data base used by the on-line system.

Software Development

First National began systems and software planning for its new network environment early in 1976.

As part of the overall plan, the bank is in the process of modifying its mainframe application systems to provide new features and a real-time interface to the front- and back-end systems.

Software development is in progress at Applied Communications, Inc., which is supplying software for the Tandem and Incoterm Corp. systems used in the network.

First National is also moving towards multiprocessor applications in response to DP requirements that are beginning to impact all commercial banks.

The emergence of EFT systems and the proliferation of on-line terminals demand continuous availability of customer information.

To meet this demand, the bank is dividing application workloads between two processing environments.

The large mainframes will continue to process the massive volume of paper-based financial transactions and perform real-time maintenance for names and addresses plus all other information that is not necessary for on-line financial transactions.

Connected to the mainframes, the Tandem systems will provide a fail-safe environment for front-end communications and back-end processing of on-line financial transactions against duplicate sets of customer account balances.

Cody is president of Applied Communications, Inc., based in Omaha, Neb.

Fairchild Coupler Links Test Gear to Mainframers

SAN JOSE, Calif. — Fairchild Camera and Instrument Corp. has introduced a digital data coupler designed to connect outputs from test equipment or other digital sources to mainframes, tape systems and other data logging hardware.

Model 1700 will accept parallel data in Binary Coded Decimal or similar codes, reencode it to computer-acceptable form, supply necessary control bits and output the data to the RS-232C terminal, CPU or logger interface, according to the firm.

The coupler will transmit asynchronously at speeds from 110- to 9,600 bit/sec, selectable through jumpers on an internal plug, Fairchild added.

Prices range from $895 for a single-channel unit to $1,195 for a dual-channel version, the firm said from 1725 Technology Drive, San Jose, Calif. 95110.

Don't use a Chicago-to-N.Y. modem between Wall St. and 42nd.

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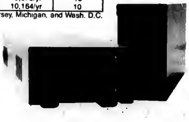

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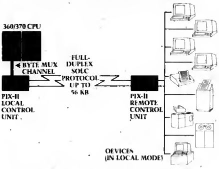
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Bit Error-Rate Tester Diagnoses Operation of Cable, Fiber Links

NORTH BILLERICA, Mass. — Tau-Tron, Inc. has extended its TM1 product line with a modular bit error-rate tester designed to diagnose the operation of various types of communications links including cables, optical fibers and satellite systems.

The system operates at speeds from 1 bit/-sec to 75M bit/sec, according to the firm.

The MN-1 data generator/transmitter reportedly can generate six switch-selectable pseudo random sequences ranging from 63 bits to more than 1M bits in length.

The MB-1 receiver module will synchronize its internal code generator automatically to the received sequence and, after linkup, make bit by bit error measurements, Tau-Tron said.

These measuremetns can be displayed on a four-digit LED display either as a total error count or rate.

The LED indicators are provided for clock and data inputs, correct phase and in synch/burst error monitoring, Tau-Tron added.

A printer option is also available to simplify long-term tests and allow unattended operation when used in conjunction with a data logging device, the company noted.

The MN-1 module costs $1,300 and the MB-1 section costs $2,550. The cabinet which supplies power and cooling for the modules costs $875, Tau-Tron said from 11 Esquire Road, North Billerica, Mass. 01862.

DNS Seen Signaling New, Basic Approach

(Continued from Page 31)

another basic architectural approach to teleprocessing networks in that it would not rely on any host CPU to manage the data communications functions.

Future networks will require "the combined power and characteristics of both the radial system plus the distributed network system," Price said.

Protocol Support

Worldwide data communications will require the adoption of standard or uniform means of data communications. These control procedures or protocols are now numerous, Price pointed out.

CDC has had to support "over 120 distinctly different protocols over a 10-year period," he said, adding the average user network today supports about five of these protocols.

Development and support of a number of protocols is expensive and in many cases ineffective. "We definitely need some standardization," but whether full agreement can be achieved on a single standard remains to be seen, he said.

For the first time, hardware costs make it possible to effectively distribute a single-standard data communications protocol throughout terminal networks, so agreement on a single-standard data communications control procedure would allow it to be implemented in a practical manner, the CDC systems president maintained.

This in turn could lead to cost-effective networks within the constraints of politics, law, economics and user needs, he said.

Data Briefs

GDC Modems and Couplers Receive FCC Registration

WILTON, Conn. — Several members of General DataComm Industries, Inc.'s (GDC) existing LSI modem family and line of acoustic couplers were registered with the Federal Communications Commission (FCC) recently.

The short-form registration procedure resulted in the FCC certifying GDC's 113BR2, 103A3, 202C, 202CR and the 208B/A modems, which operate at transmission speeds from 300- to 4,800 bit/sec, according to a company spokesman.

The company's 1000 ACDT and 1001 B/-CBT couplers were also registered with the FCC, he said.

The modems can now replace other modems and couplers that require Bell Data Access Arrangements (DAA) and can be directly connected to the telephone network via FCC-approved plug and jack arrangements, GDC said.

The company is located at 131 Danbury Road, Wilton, Conn. 06897.

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Com-Tech Test Sets Permit Single-End Link Diagnosis

NEW YORK — Com-Tech Systems, Inc. has introduced a series of Link/-Chek test sets which reportedly permit the performance of interactive communications links to be monitored from one end of the circuit.

Half- or full-duplex or multidrop lines and modems can be tested from a single end using an unattended on-line Link/-Chek slave unit at the remote end, a spokesman explained.

The information also can be used to facilitate fault isolation between the business machine, the modem and the line, Com-Tech said, adding the test sets can be left on-line.

The slave units in the four Series 202 versions automatically distinguish between normal traffic and the test pattern generated by the master unit, he said.

Bit error rate, test progress and operational indicators are provided by the master unit, the company said, adding the associated slaves also have status indicators.

Four Master Versions

The four master versions offered are the 202M for half-duplex or noncontinuous carrier full-duplex systems; the 202L for continuous carrier full-duplex links; and the 202PM or 202PL for multidrop circuits.

The master units cost $715, $770, $1,035 and $1,090 respectively. The companion slave units are priced at $480 for the standard 202S and $630 for the 202PS for multidrop lines, the spokesman noted from 44 Beaver St., New York, N.Y. 10004.

SPC Offers Two Revived Versions Of Datran's Switched Digital Net

(Continued from Page 31)

keypad, SPC said.

Costs for the 2,400 bit/sec transmission service are $50/mo for Datalink equipment, in addition to a $150 nonrecurring installation charge and a charge of $25 plus $2/mile for the access channel.

SPC said it will charge $100/mo for the Datalink, $200 for installation and $25 plus $2/mile for the access channel for users desiring a 4,800 bit/sec link

For a 9,600 bit/sec channel, users will pay $150/mo for the Datalink, $200 for installation and $50 plus $2/mile for the access channel.

Five Usage Categories

The five usage categories are 0- to 40 hours, 41- to 100 hours, 101- to 240 hours, 241- to 1,440 hours and over 1,440 usage hours, SPC explained.

For Category A (40 hours or less total usage each month), Datadial I charges range from 25 cent/min or $15/hour at the 2,400 bit/sec speed to 35 cent/min or $21/hour at 9,600 bit/sec, the company said.

Users who accumulate, for example, 200 hour/mo of connect time (Category C) will be charged $7.37-, $8.31- or $14.40/hour respectively, according to the transmission speed used.'

Charges drop with the increase in number of usage hours.

For example, users who accumulate 1,440 hour/mo of network time (Category E) will be charged $6-, $6.60- or $10.22/hour at the three transmission speeds, respectively, according to the firm.

Datadial II

SPC's Datadial II service is an offering of transmission facilities operating at 2,400- or 4,800 bit/sec speeds between a designated service origination point and numerous remote Datalinks for a minimum period of 240 hour/mo on an area, regional or nationwide basis, chosen by the user.

Calls betweeen the remote Datalinks will be billed under Datadial I rates. Service origination points include each of the major cities served by the network, according to the carrier.

Data calls transmitted at the 2,400 bit/sec speed from the service origination points for the first 240 hours used will cost $600, $1,000 or $1,375 on area, regional or nationwide bases respectively.

Data transmitted at 4,800 bit/sec will cost $800, $1,150 or $1,500 respectively, on the same bases for the first 240 hours, SPC said.

There is a charge for each additional hour of connect time used on the switched digital network at both available transmission speeds, the company said.

And the number of remote terminals within a Datadial II station group are restricted in certain cases, the carrier indicated.

There will also be charges to users for the Datadial II access channel and the Datalink, in addition to the charges for the minimum 240-hour period, SPC said.

SPC can be reached at 1 Adrian Court, Burlingame, Calif. 94010.

HP 2026 Dedicated To Data Transmission

(Continued from Page 31)

the headquarters' mainframe can be made using standard IBM-compatible bisynchronous 2780 or multileaving Hasp protocols, the firm stated.

In this mode, however, a user would not to be able to take advantage of the increased throughput capabilities achieved by using dedicated 2026 systems at the remote and local sites, the spokesman noted.

When two 2026 systems are used, the user has the option of connecting the local 2026 with cables or manually transferring a magnetic tape to the host CPU, he said.

Data can be entered on up to 16 CRT terminals at any site. The same data entry formats are shared by all 2026 systems in the network, which can be specified at the headquarters' DP site with 2026 Data Entry Application Language (Deal) software.

These formats are called up locally by keystroke and guide and prompt each terminal user. Entries from multiple CRTs are automatically queued for later transmission, the company said.

The system, it added, can accept entries and transmit stored data simultaneously.

The basic 2026 costs $38,500. HP software is included in the system price and carries a monthly maintenance charge of $70.

Each additional 2645A CRT, for example, costs $4,325, the spokesman said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

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Bits & Pieces

Five Publications Offered Free to Interested Readers

Free literature is being offered to *Computerworld* readers by five companies.

A publication on the history of removable magnetic data and word storage media is available from Information Terminals Corp., 323 Soquel Way, Sunnyvale, Calif. 94086.

A second California firm, Processor Technology Corp., has an illustrated 22-page color catalog describing its line of CPUs, systems, peripheral equipment and software. The firm is at 6200 Hollis St., Emeryville, Calif. 94608.

A brochure describing the 3M Co. Beta Software System for computer output microfilm is available from 3M, Department Mi7-20, Box 33686, 3M Center, St. Paul, Minn. 55133.

Taurus Corp., Academy Hill, Lambertville, N.J. 08530, has a four-page, two-color catalog covering its Series H badge and card readers for OEM and systems applications.

Finally, a 32-page catalog describing dc power supplies and related devices has been published by Standard Power, Inc., 1400 South Village Way, Santa Ana, Calif. 92705.

Tear-Bar Tractor Offered As Sycor Sprinter Option

ANN ARBOR, Mich. — Sycor, Inc. has developed a tear-bar tractor option on its Sprinter bidirectional matrix printers.

The tractor accepts five-part, sprocket-feed forms from 4- to 15-in. wide.

The paper backup is implemented by the use of sprockets both above and below the platen. The tear-bar tractor model is available as a rear-feed, table-top printer or with an optional stand for front feeding.

Sprinters with tear-bar or standard tractor range in price from $155 to $276 per month on a one-year lease. The purchase price ranges from $5,800 to $8,820 from the firm at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Harris Reduces Character Size Of Model 1652 Chain Printer

DALLAS — A smaller character size that enables the Model 1652 chain printer to produce 8 line/in. is being offered by Harris Corp. The 1652 is available with the Harris 1600 remote communications processors.

The .079-in. character set is available in 48-, 64- and 96-character Ebcdic and 64- and 96-character Ascii.

The cost of the smaller set, scheduled for delivery in August, is included in the base price of the 1652 printer, Harris said from 11262 Indian Trail, P.O. Box 44076, Dallas, Texas 75234.

Eases Software Burden

Centralization Backs Distributed Users

By Ronald A. Frank
Of the CW Staff

ST. PAUL, Minn. — A good distributed processing system can combine the features of both centralized and decentralized systems, according to James Sandum, former director of management information systems (MIS) at Horner Waldorf Corp.

Speaking at a Computer Caravan session here recently, Sandum described how a network of Four-Phase Systems, Inc. minicomputer-based systems were implemented at 27 sites in four divisions of the paper-processing firm.

Admitting that most applications do not generate data that is useful to both central and decentralized files, Sandum described a payroll program run by the remote sites which transmits corporate tax information to an IBM 370/135 at corporate headquarters and also generates payroll information at the remote site.

The distributed systems were implemented under control of the MIS group with the understanding that all sites would acquire the same hardware, he told attendees. Although each site now has a varied mix of software requirements, there are standard packages used to perform the same functions.

Several of the remote minis may be using the same applications software, although each may utilize it in a slightly different way, he said.

Biggest Problem

The biggest problem in implementing a computer system at a remote site is getting the on-site staff to understand it is not isolated from DP assistance, he said. When the company installed the first Four-Phase systems about three years ago, the MIS group ran a "survival course" to instill confidence in the DP staff that would have to live with the system. The course included three days of training during which the system was deliberately made to malfunction.

After a number of sites began to operate with the same mini-based equipment, it was possible for these users to consult with one another when problems arose, he said.

Although each plant can decide for itself which programs will be needed, no software is written at the remote sites, he said. All program development is done by the MIS staff at the DP center, but remote site staff members are actively consulted so they will be a part of the development process.

"When a remote plant installs its mini-based system, we make people feel that it is their system," Sandum said. Despite this outward autonomy, the central DP staff does all software work and a centralized response team is available when a remote system is in serious trouble.

Software changes are transmitted to the remote systems when other DP activity is at a low point. The network uses Binary Synchronous Communications and each Four-Phase system looks like an IBM 2780 terminal to the 370 mainframe, Sandum said.

During the start-up phase, MIS project teams worked with each site developing the necessary software, and systems were being turned up at the rate of one per month.

The company is now considering a two-tier approach in which each remote site processor will become a "mini host" to its own terminal subsystem.

The key to implementing a successful distributed system is to first define exactly what is needed, Sandum said. Once these goals are defined, the user will not be led by vendors. Instead, they will be able to spell out what vendors will have to accomplish if they want to sell their systems, he said.

NCR 8000 Designed to Simplify Migration

NEW YORK — The recent introduction of NCR Corp.'s 8000 series was aimed at giving its users a logical, convenient transition path to larger and more advanced systems, the company said.

In contrast, there is no migration path from the IBM 3 to the 370 series, a spokesman observed. "When a user reaches the end of the line with the 3, he faces an imposing conversion effort in moving to the 370," he said.

Through a common disk system and a "building block" operating software system, users of Century series CPUs can move from entry-level systems to larger systems without having to experience heavy reprogramming or other conversion costs, the firm said.

Simply put, if a user's present system becomes overtasked, the solution could be as simple as changing processors.

The migration paths also allow NCR users an entry route into distributed networks, either directly from the 8200 family or through the 8400 family.

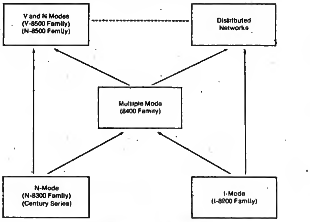
"The high degree of compatibility among NCR systems means users are not penalized by excessive conversion costs or redundant systems requirements," an NCR spokesman said.

"Compatibility is essential," he added, "because the biggest costs in DP today are nonhardware costs, including programming and documentation costs. Without a high degree of compatibility, those nonhardware costs can rise even more dramatically as DP requirements grow and as technology provides better approaches.

"Many of the future conversion costs can be reduced or eliminated by placing emphasis on compatibility," he forecast.

"A user starting with an equivalent NCR Century or 8000 series system can take the same programs and most of the same peripherals and move progressively toward more powerful Century or Criterion models with minimal changes in programming," he claimed.

"Where most vendors usually offer different operating systems for different product lines which require at least a recompilation of file and structure changes, NCR's approach is that the company offers a combination of processing modes in a single system so the user can change from one type of processing to another," he concluded.



NCR User Migration Paths

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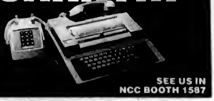

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Graphics System Cuts Time Required to Test Aircraft

LONG BEACH, Calif. — CPU-driven graphic display systems that enable ground-based engineers to analyze "live" information telemetered from in-flight aircraft are helping engineers at McDonnell Douglas Corp. to sharply reduce overall flight test times.

The graphic display systems are part of McDonnell Douglas' automated system that has been used for more than six years to support test flights of the DC-10 and DC-9 series aircraft, the A-4 attack plane and the new YC-15 aircraft.

Using the SA/900 graphic systems from Sanders Associates, Inc., engineers can select telemetered information from the ground CPUs and display it on 20-in. television-like screens in graphs and scales. By controlling and monitoring experimental flight operations, ground-based engineers can respond to the displayed information while the aircraft is still aloft.

Engineer analyzes flight data on graphics display.

McDonnell Douglas test engineers, observing the data, can immediately advise the flight crew whether to proceed with the next maneuver in the flight plan.

Previous systems normally required days to determine the success of a particular flight.

On the Ground

An engineering test pilot is normally assigned as test controller in the center during every telemetered flight. He is in constant voice contact with the plane's crew via a microwave-tracking station link and can monitor all phases of the test operation on his own CRT display.

The pilot-controller coordinates the flight crew's actions with the real-time data on aircraft performance appearing on his screen to refine and perfect each test procedure as it happens. Thus, the test controller, the test director and the pilot in the air work together to extract maximum information from every hour of the flight.

The system reduces repetition of tests that yield inconclusive data on the first effort—a costly factor in previous flight development programs. From a four-hour test flight, for instance, three engineers working two hours can obtain the information and flight objectives. Before the automated system, the same data required four or five days.

Using light pens, push-button controls and typewriter keyboards coupled to the CRT and mainframe units, McDonnell Douglas engineers direct the CPU in building a complete graphic presentation of data on the CRT screen from a particular phase of testing.

Processed Into Format

In seconds, the automated system sketches out a basic test report format preprogrammed into the system's memory disks. The operator then calls up the specific information required and directs the system to process it into the desired format.

When all necessary data appears on the screen — for example, as a plot of time, airspeed and flight control positions — the engineer pushes a pair of buttons on his control board.

The entire display is then permanently recorded on microfilm and an automatic copying machine produces a paper copy as well. The hard-copy and microfilm recording machines are also part of the Sanders system.

Even while a flight is under way, the CPU can perform the final analysis of data from another flight, using information stored by the airborne tape recorders and delivered to the control center after landing.

Probe Works With 370

PAINESVILLE, Ohio — AP Products, Inc. has developed an oscilloscope probe for use with IBM 370 and similar high-speed system connectors.

The probe inserts directly into the connector housing or onto the pin and rail connectors. The attached socket accepts most typical diagnostic oscilliscope probes.

The probe is polarized to protect agianst improper orientation and the contacts are gold-plated phosphorous bronze, it added.

The probes, part number 922037, costs $65 from AP at Box 110, Painesville, Ohio 44077.

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With Datapoint you can keep the software, too. For openers, the Disk Operating Systems are all upward compatible (utilities included). The DATABUS® program you wrote for the Diskette 1100 installed last year in a field office can be loaded into that office's multi-user DATASHARE® system and run — generally without changes. Your software investment remains secure.

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If you have a mainframe, good; the field Datapoints will make it more productive than ever. If you don't have your own mainframe, then look into putting all the workload on your network of Datapoints. A lot of sophisticated users are doing just that.

Pick a system, any system

Network builders need to be able to specify the precise amount of computer power and peripheral capacity to match the needs of each field facility. Here's what Datapoint offers:

And remember, Datapoint is constantly introducing new, more powerful units.

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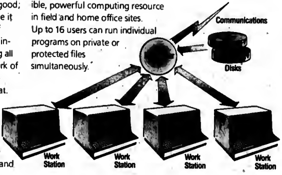
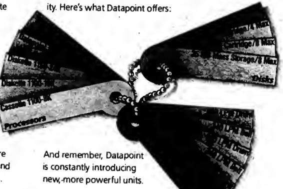
Diskette 1100 and 1150 Dispersed Processors offer built-in keyboard, video displays, and diskette memories, and a choice of either 16K or 24K processors. You can enter data, check local data bases and communicate to a central computer concurrently, too, if you need that capability.

Multiple work stations

DATASHARE, Datapoint's Business Timesharing System, puts a flexible, powerful computing resource in field and home office sites. Up to 16 users can run individual programs on private or protected files simultaneously.





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And Brings Nearly $160,000 Savings

In-House COM Defuses State's Paperwork Explosion

KANSAS CITY, Mo. — The State of Missouri has defused a paperwork explosion caused by a proliferation of computer-generated information by reducing the data to microfilm. The result is faster, more economical and easier to handle distribution of computer-generated data, according to James C. Kirkpatrick, Missouri's Secretary of State.

State agencies initially utilized the services of an outside supplier who provided computer output microfilm (COM) services beginning in 1973. More recently, the Secretary of State's office was requested to do this work.

Switching to in-house production has produced greater reliability as well as time and cost savings, Kirkpatrick said, adding there has also been a gain in confidentiality when dealing with sensitive government documents.

"We have several daily applications for COM," he explained. "For example, the Employment Security Agency produces a computer tape at 6 p.m. each day and must have the computer-generated microfiche back by 10:30 p.m. for distribution statewide before morning. If the deadline is missed, that microfilm is useless.

"Several departments have told us that if they didn't have computer-generated microfilm, they might as well close their doors," Kirkpatrick said. "There is no other way to distribute the information they need so widely at such a low cost."

As an example, he cited 114 state unemployment offices that are supplied weekly with a set of "job bank" microfiche listing many available jobs.

"One or two microfiche, which we can mail for 13 cents, take the place of 400 to 500 sheets of paper, which would be bulky and difficult to transport to 114 offices," Kirkpatrick said. "It is also much quicker to make that many duplicates using COM."

He pointed out that a line printer takes 200 minutes to print out the material that can be produced on a computer-generated microfiche in 30 seconds. In addition, each duplicate of the original microfiche takes about one-half second to produce — but the line printer requires an additional 200 minutes for each and every copy.

"We used a step-and-repeat camera to make duplicates of our printouts before we began using COM," Kirkpatrick said, "but this was much slower and more costly."

The state started producing COM in-house on June 1, 1976 using a 3M Beta System 700S COM device.

"The various state agencies use seven different mainframes, so we needed a COM device that could accommodate differences in programming," Kirkpatrick noted. "The 3M Beta System has an internal front-end computer that is compatible with all our DP systems."

The COM device is set up in a 42X reduction mode. This allows the state to reduce 207 pages of information and one index frame onto a 4- by 6-in. piece of film. The device can copy 14,000 line/-min. More than 60 unique applications have been put on the device so far, Kirkpatrick said.

"Depending on the agency, we run applications daily, weekly or monthly, with various summary reports taking place at longer intervals. The 3M system has ample capacity to handle many more applications," he added.

Substantial Savings

"On paper, we gained no real time in turnaround," according to Russell Brown, director of COM services. "But in practice we can keep better tabs on our supplies and other details."

Cost savings have been substantial. Formerly, the state was charged 54 cents for each original microfiche; these are produced internally for about 14 cents. Duplicates that used to cost 10.9 cents each now can be made for 8.1 cents. Two microfilm duplicators are used for this purpose.

"We projected savings of about $100,000 the first year, but it looks as if we will be closer to $160,000," Brown said. "These savings are greatly appreciated by the agencies. Still, COM is so essential to many of them that they would not reduce their volume even if the cost were double or triple what they are."

networking 'family' approach

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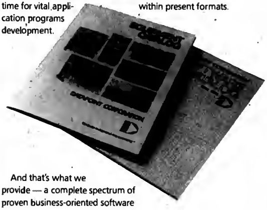

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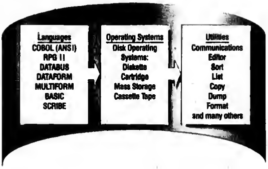

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Insurer's Dispersed Minis Working 'Extremely Well'

By Ann Dooley
Of the CW Staff

ST. PAUL, Minn. — "I don't think everyone should be using minis; you need to look at your individual environment and decide for yourself," Tom Lee, programming manager at American Hardware Mutual Insurance Co., told Computer Caravan attendees here recently.

But, he added, "minis have worked extremely well for us at American Hardware."

American Hardware used a paper tape system until 1974, when it decided to increase capabilities and communications within its five division offices around the country. In trying to find the best system for its needs, the firm looked at systems using disk, centralized storage and magnetic cards as well as paper tape, Lee said.

After careful examination, the firm decided to purchase five Four-Phase Systems, Inc. 72K IV-440 minicomputers and run them on-line to an IBM 360/50 with 512K bytes located at the company's Minneapolis headquarters.

American Hardware is a property and liability insurance company with premiums worth $75 million, according to Lee. "We handle about 1,000 transactions, but there might be 2,000 differences between each policy," he said.

Although there aren't that many different transactions, each one is very complex, he added.

Each individual division of the firm can now do its own work, Lee said. The divisions handle the claims processing and underwriting and communicate with the IBM 360/50 by leased lines.

Simplified Data Paths

"One reason we wanted more processing done in the division offices was to simplify data path problems by putting the processing at the point of sale," Lee said, "and it's worked amazingly well for us.

"We really wanted to simplify, and with the minis we've been able to do that," he added. "We're dealing in a much simpler world now and it's much easier to get along.

"We might not have as much power in one spot, but we have more spread out perhaps and for less money."

American Hardware has 27 different policies available and wanted to write one program to handle all of them, so it used a format file, Lee explained to his audience.

Menu Options

"We have menu options to choose from and the screen on which they're shown is edited field to field," he said. When the operator makes an error, the edit process stops until the mistake is corrected; a noise is emitted from the machine as a further indication of error.

"There are much fewer errors overall because of this, and the operators also prefer it," Lee said.

Once the policy is transmitted from a division to the 360/50 and cleaned off the Four-Phase file, it's wiped clean and that part of the disk pack can be used again, he noted.

The IV-440s can operate off-line from the CPU, Lee noted. This helps a great deal if the 360/50 goes down because the divisions can keep on with some of their work, he said.

Being centralized as well as decentralized in this way is an added assurance of everything running smoothly, he said.

"When we're off-line, no records can be retrieved or any error checks occur at the 360 site, though," Lee pointed out.

Selection Process

"We went through a very careful process in choosing a system," Lee told the Caravan audience. "We had five people studying the different systems over a four-month period, devoting about 50% of their time to the project."

The major goal was to put the most processing capabilities out in the divisions for the least amount of money, according to Lee.

American Hardware studied the difficulties and benefits of conversion, the installation time, user acceptance based on division feedback and hardware support.

With these goals in mind, the firm also examined how expandable to a future data base the system would be, how much it

(Continued on Page 42)

Esba planning board uses portable system at meetings.

Large Firm Uses Small System To 'Take Heat Off' Mainframes

By Esther Surden
Of the CW Staff

LAKE SUCCESS, N.Y. — A portable small business system is "taking the heat off the operations department" at Eastern States Bankcard Association (Esba) by helping to plan the budget more efficiently, according to Bruce J. Simons, director of planning.

The IBM 5100 system supplements the work of two IBM 370/158s and assorted other computer equipment including a Tandem Computers, Inc. Nonstop multiprocessing system at the firm's data center.

Esba handles transactions for over 1.5 million charge card holders. "Running this kind of operation is highly complex," Simons noted. "With the many interactions between our departments, just planning the annual budget used to take a number of meetings held over a period of weeks. Now we do the same job in much less time using the portable system."

The firm considered other systems before going with the IBM, he noted. "The Wang was a little cheaper," but the IBM system offered an advantage because it features multiprogramming.

Both APL and Basic

The company has the model of the 5100 system that includes both the APL and Basic languages so the financial and marketing people can use APL while others use the Basic. "The system is primarily used in staff areas," Simons pointed out.

Esba also liked the system's portability. "It can be taken to meetings or other facilities," Simons said, and "I can work on programming at home." The Wang system was too heavy for this, he indicated.

When the system is used at planning meetings, it sits on the conference table; small CRTs are hooked up to it so all attendees can see the results in real-time.

"It flashes the results of proposed budget changes to TV monitors set up before committee members. This enables us to see the effects of a proposed change in one department's budget on the budgets of all the other departments," Simons said. "We save days with the system."

The programs used on the IBM 5100 were written by Esha and are recorded on a cassette tape which is inserted in a slot on the front of the computer. The cassettes can be locked up for security purposes, Simons said.

Memorex Makes 3340-Type Unit Available to IBM 3/15 Users

SANTA CLARA, Calif. — The Memorex Corp. Model 3640 disk storage subsystem can now be used with IBM 3 models 15B, 15C and 15D as well as the IBM 370/115 through 168, according to Memorex.

The subsystem, which can be used as a functional replacement for the IBM 3340 direct access storage facility, includes a Memorex 3643 disk drive module and controller and one Memorex 3640 disk drive module for a total capacity of 205.8M bytes, the vendor said.

Two Disk Drives

The 3640 unit incorporates two high-speed disk drives, each of which uses Memorex's Data Mark 70, IBM 3348 or equivalent data modules, the firm said. Each drive provides a storage capacity of 51.4M- or 102.9M bytes per module.

The 3643 includes two drives plus interface electronics for attachment to the IBM 3. The 3640 module can also be attached to an IBM 3340 Model A2, the company added.

Identical to 3340

The data transfer rates, rotational speeds and average latency on the 3640 are identical to those of the IBM 3340, Memorex claimed. Autoloading and read-only capability are standard on the Memorex unit, the firm said.

A typical configuration with one Memorex 3640 and one 3643 leases for $1,355/mo on a 24-month contract. The 3643 costs $28,800 to buy and the 3640 costs $20,200 for a total cost of $49,000 for that configuration, a Memorex spokesman said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

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System Rings Up Savings for Food Chain

EL MONTE, Calif. — Vons Grocery Co., operator of 130 supermarkets in southern California, is using a distributed processing-oriented system to capture product movement information and turnaround invoices, according to James C. Griffin, Vons' DP manager.

"We've identified several areas of savings," Griffin said. "First, we are saving store labor time. Second, we've offset some keypunching time. Significant savings have been realized in collecting discounts we were previously eligible for but could not collect, and we've also saved in buyers' time."

Under Control

Like most large grocery chains, Vons has a central facility that includes warehousing and produce distribution. Information on merchandise moving from the central facility is "fairly well under control" and is processed on an IBM 370/158, Griffin said.

But the exceptions are substantial and come under a class of transactions known as "direct delivery accounting." This category covers items delivered directly to each store by some 350 vendors who generate 18,000 invoices a week. Direct deliveries include dairy and meat products and are approximately half of the grocery volume, Griffin explained.

Vons has installed a Computer Automation Syfa system — which when fully implemented will include 12 to 16 information stations — to assist the marketing department in allocating shelf space based on product movement information.

It will also assist accounting in extending invoice data to comply with cost, retail price and payment deadline reporting. Vons employs the retail accounting system.

Direct Delivery Problem

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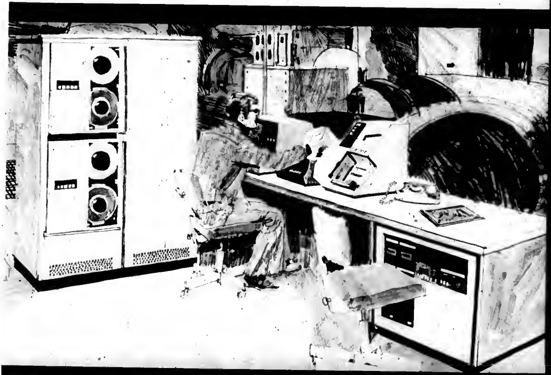

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System Rings Up Savings for Food Chain

EL MONTE, Calif. — Vons Grocery Co., operator of 130 supermarkets in southern California, is using a distributed processing-oriented system to capture product movement information and turnaround invoices, according to James C. Griffin, Vons' DP manager.

"We've identified several areas of savings," Griffin said. "First, we are saving store labor time. Second, we've offset some keypunching time. Significant savings have been realized in collecting discounts we were previously eligible for but could not collect, and we've also saved in buyers' time."

Under Control

Like most large grocery chains, Vons has a central facility that includes warehousing and produce distribution. Information on merchandise moving from the central facility is "fairly well under control" and is processed on an IBM 370/158, Griffin said.

But the exceptions are substantial and come under a class of transactions known as "direct delivery accounting." This category covers items delivered directly to each store by some 350 vendors who generate 18,000 invoices a week. Direct deliveries include dairy and meat products and are approximately half of the grocery volume, Griffin explained.

Vons has installed a Computer Automation Syfa system — which when fully implemented will include 12 to 16 information stations — to assist the marketing department in allocating shelf space based on product movement information.

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CONTROL DATA CORPORATION

Mini System Keeps Track of Utility's Plant Equipment

BELLEVUE, Wash. — A minicomputer-based system at Puget Sound Power & Light Co. here is helping managers keep track of plant investment, associated property taxes, electrical loan densities and cost of services.

The system is also used in locating both overloaded and underloaded transformers, plotting power flow and producing various charts and graphs.

At the same time, the system serves as the CPU in a computer-aided drafting system for producing schematics of substations, panel wiring and other electrical facilities.

Puget uses an Hewlett-Packard Co. 2100 processor with 32K words of memory, a 5M-byte disk subsystem, tape drive, printer card reader, a California Computer Products Inc. drum plotter, Tektronix, Inc. CRT and a digitizer, according to Gerry Lonergan, director of DP.

The system augments the utility's 370/148 and is managed as an integral function of the DP department, he said. All of the software for the graphics system was developed in-house, he added.

"At the time we purchased the HP 2100, we acquired it for a limited application," Lonergan said, noting that only a particular combination of equipment would do and HP and Westinghouse could supply that combination.

But when the firm decided it needed to put on more applications, "we found it was economical to upgrade the computer," he said.

Tax Code Areas

For tax reasons, the system locates the utility's plant equipment that is distributed over nine counties in the state.

"It is essential for tax purposes that we know exactly our equipment investment in each geographical area we serve," according to Robert D. Nelson, manager of engineering applications. "Each year there are hundreds of changes in the tax code areas.

"The system is helping us handle these changes much more efficiently than was done in the past manually," he added.

There are approximately 2,000 tax code areas (TCA) in the counties served by Puget. The amount of investment in each area is proportional to the annual tax that must be paid by the utility to that entity, Nelson explained.

These TCAs consist of school, water, fire, sewer and other districts, each of them having unique but overlapping geographical boundaries, he noted.

Geocoded Data

To produce accurate tabulations of the taxes owed to each jurisdiction, county maps provided by the state are digitized with a 30-in. by 400-in. digitizer, Nelson said.

The HP system collects the geocoded data describing each TCA and produces on a drum plotter a computer-generated overlay of the original map.

This is then easily checked by overlaying the new plot on the original map and comparing the borders, he added.

Once checked, the digitized data are transferred to magnetic tape and used as input to a batch operated, large IBM 370/148.

In its disk files, the mainframe contains a complete list of all the company's transformers and their locations according to a state-level plane coordinate system. Using this data, the system determines the total capacity of the transformers in each TCA.

Since the capacity of transformers is directly proportional to the plant investment in general, the total equipment investment in each TCA is calculated and tabulated for use by state and county tax officials, Nelson explained.

Using this method, the company is assured that no errors are made since the input geographical data is checked visually, and the transformer location data are also checked visually against detailed master plans of equipment locations.

The HP system ensures that TCA numbers are not repeated by mistake and also corrects for scale variations associated with distortions due to printing maps, he added.

Mini Aids Planning

Another important use of the mini-based system is to produce graphical presentations of data for planning purposes, Nelson said.

The perennial question around any utility is where to add facilities and with what capacities.

Very significant amounts of money are committed each year.

Optimizing the decision for maximum efficiency is an ongoing process here, he added.

Using a graphical output of the transformer distribution and load by section, township and range location, planners can study the density of existing load on the system and make comparisons with past years.

Basis for Additions

The comparison can reveal graphically where growth has taken place and thereby provide a basis for future additions of capacity.

Used in conjunction with tabulations of which types of customers are in which particular grid locations, the precise nature of that growth can be determined, he indicated.

"The plots allow for conceptualization," Nelson said. "That makes it possible for everyone concerned to obtain a firm grasp of the changes taking place in our customer and plant base."

Span Has Turnkey Systems Based Upon IBM Series/1

EAST PROVIDENCE, R.I. — Span Management Systems, Inc. here has expanded its line of turnkey systems based on the IBM Series/1 mini and added applications programs and line printers to the options available for them.

Based on the Models C and D introduced by IBM recently, the Span systems use 32K-byte storage cards, according to a company spokesman.

A minimum configuration of a 4953 Model C with 32K bytes of memory, 9.3M bytes of disk, 600K-byte diskette, CRT terminal and a 120 char./sec printer including Span's SVM operating system costs $32,000 to purchase or $990/mo on a four-year plan.

Users must purchase maintenance for the system directly from IBM, he added.

Virtual Memory System

The SVM operating system is a virtual memory system that is a subset of the firm's previously announced TSS/1 operating system.

Available in July, first releases will include disk swapping, password security, user-defined name files, a command language and a user interface module for defining a unique command library, Span said.

The firm has also unbundled the applications software available for its system, the spokesman said.

The SVM will cost $5,000 on a single-user license basis. An order entry/invoicing package costs $1,700; inventory management and payroll each cost $1,400; sales analysis and product definition and costing costs $1,300; and a medical billing program costs $3,600.

Unbundled Software

The unbundled software is available on a single-user license agreement without hardware or can be part of a turnkey package, the firm said.

Additionally, Span is offering Data 100 Corp. printers for the IBM systems as well as for Digital Equipment Corp.'s PDP-11 and PDP-8 minis.

Deliveries will begin in August.

Prices range from $6,000 to $9,000 depending on the speed, which range from 200 line/min to 600 line/min, and the interface required.

Span is located at Westminster Industrial Park, East Providence R.I. 02914.

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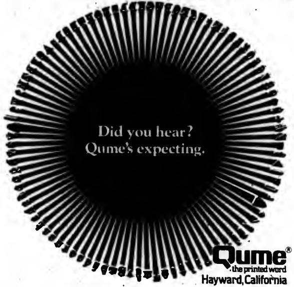


More Time for Selling

Desktop System Ends Drudgery Of Preparing Sales Proposals

DALLAS — The drudgery has been taken out of proposal preparation for salespeople at Rockwell International's Collins Broadcast Products Marketing Group with the installation of a desktop, disk-based minicomputer, according to Al Senter, manager.

The marketing group, which has access to a number of mainframes, cost-justified the small system to perform this dedicated application with the help of its central DP department, Senter said.

"A small system made sense for a dispersed application of this size and type even though we had large-scale systems available to use," he explained. The large systems people helped in equipment selection and programming and will help to put additional applications on an upgraded system later, Senter added.

A file on the system includes product features, service information, special instructions as well as price and cost data. Proposal-generating programs were written by Senter and systems designer Frank Kirzan.

System Does the Rest

Now salespeople determine their customers' requirements and the system does the rest, producing a document showing all the necessary items and descriptions with prices totaled.

The proposal-writing application had previously been performed by hand; salespeople typed their own proposals. But "they weren't hired as typists; they were hired as salesmen. Consequently, the quality of the typing left a lot to be desired," Senter said.

Typing the proposal was a lengthy process for many of the workers, who were tempted to take shortcuts in preparation. A proposal could include 80 to 100 items, Senter said, and some of the salespeople described each item in the barest of terms, leaving up to the imagination much of what was included in the price.

The proposal writing also took time away from direct selling, Senter noted. In addition, it was a lengthy process to find out price changes on the over 2,000 different items that could be affected monthly since the salespeople were working from price lists.

Psychological Boon

Savings, therefore, have been realized in productivity and accuracy. But in even the more tenuous area of psychological health, the installation of the system has had a great effect, Senter said.

After a week of selling on the road, salespeople hated the idea that nights and weekends were spent trying to come up with proposals. This burden has been relieved from them, Senter indicated. "Now all they do is call down to a secretary at a machine and that's it," he stated.

The small system in use at Collins is a Datapoint Diskette 1100, which uses floppy disks. It was chosen over others available because "the 1100 may be the lowest price mini with disk capability," Senter said, so the company could start a dedicated application with a minimum investment.

And after this application was cost-justified, more applications could be added and the hardware upgraded without changing the software, he added.

The system with two diskette drives costs $13,480 or $226/mo on a three-year lease. The printer used for the application costs $5,430 or $167/mo, Datapoint said.

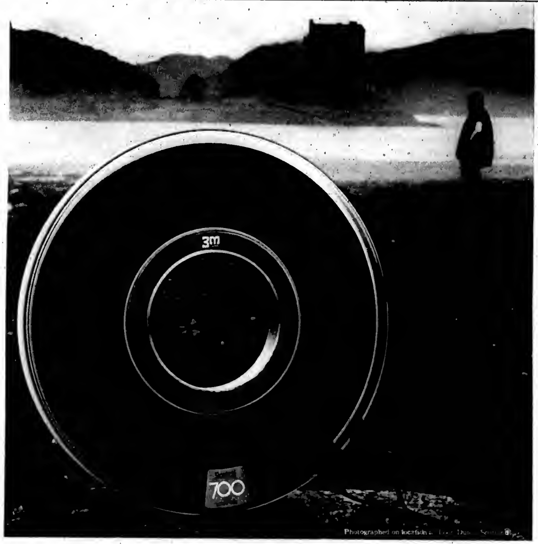
Future use of the system for the proposed-writing application include using it in "telecommunications mode," Senter said. "Right now inputs are done verbally, telephoned to a secretary who keystrokes them into the terminal, and output is mailed either to the customer or to the salesman."

Portable Terminals

Portable terminals will enable the salespeople to access the computer themselves and also have a temporary copy of the proposal to keep or give directly to a customer.

The proposal writing is just the first step in a whole loop of activity that could someday be handled by the system, Senter said.

Orders, order entry, purchase orders for subcontractors billing and invoicing can also be handled by the system. Inventory probably will not be put on the small system because of its size, but with some kind of communications link to the large system," we could access that computer for the portion we need at any given time," he said.



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Distributor Reducing Inventory, Man-Hours With Small System

HARTFORD, Conn. — A small business system is saving an automotive parts distributor here between $15,000 and $25,000 annually in reduced inventory, according to the user.

The system installed at Battery Ignition Co. is also saving the firm two- to eight man-hours per day in generating printed reports such as the daily operating report, lost order journal and sales analysis by product line and part order, according to Judy Krutt, secretary and purchasing agent.

Previously on an all-manual card system, the firm decided to automate when the number of parts to keep track of reached nearly 20,000 and could no longer be handled by the old system. It looked at small systems and attended an automotive industry exposition where various systems were displayed.

"Several of the companies contacted us, but most of them could not offer local maintenance service," Krutt said. "That scared us off because availability of immediate service . . . is critical to our operations."

With a workstation on the counter, Judy Krutt can check on an item without interrupting the phone conversation.

Battery Ignition also contacted IBM but, Krutt added, "a very important thing to us was availability of workstations. Also, we would have had to pay extra for programming because the system was not geared to our industry. Pretty soon we would have been adding dollars upon dollars to the system."

Some companies only offered hard-wired inventory systems, with the programs permanently stored in the system. "This type of system would have left us with too little flexibility," she said.

The firm finally chose a Wang Laboratories, Inc. WCS/30 system with 10M bytes of disk and a line printer. The system is connected to a Wang 2200 workstation located at the front counter and service is close by, she said.

"Before we received our Wang system in July 1976, the counter man had to go all the way from the counter to the back office to look at the card file to determine if we stocked an item. We preferred this kind of check because occasionally a line item can be in stock, yet not be immediately visible on the shelf. In this way, if the item was in stock, it was searched for until located and the sale was made," Krutt explained.

With the workstation on the counter, the item can be retrieved without even interrupting telephone conversations, she noted.

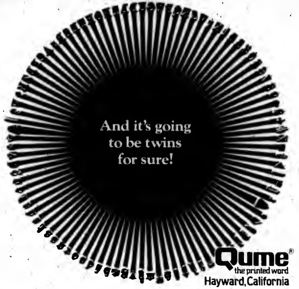
The firm handles a volume of about 100 to 200 customer orders each day and the system runs full-time five and a half days each week.

Battery Ignition is in the "final throes" of putting all the inventory on-line, Krutt said. "We didn't hire someone to come in and put the inventory on-line and there is a lot of associated research to do. We are hoping to be completely on the system by July."

Besides inventory control, another helpful program on the small business system is a back-order program which "allows us to keep tabs on items that our customers have ordered which we may not have in stock. We can produce a printout at the customer's request. We could never do this before. Furthermore, it makes a good impression on the customer and it's accurate."

The system also displays a warning "flag" as soon as any of the stock items drops to the reorder point. It prints the necessary reorder quantity. "Thus, warehouse space is used to maximum efficiency," she claimed.

Programs on the system generate a daily operating report; lost sales journal; sales analysis by line, location or item; low movement report; recommended order list; automatic price updates; and end of quarter and end of year reports.



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Mini Satisfies College's Needs While Minimizing Service Loss

By R. Waldo Roth
Special to Computerworld

TSAILE, Ariz. — When Navajo Community College here decided it needed a minicomputer for administrative and instructional purposes, college officials looked around for a configuration that could be serviced in this remote location.

The college also needed a system designed to minimize loss of service in the event any piece of equipment went down,

Hence, no card reader was selected. Printing terminals were required to have capabilities similar to those of the line printer with 132 print positions and line control capabilities. Memory segments had to be capable of being bypassed and no single auxiliary storage device would be used.

The college considered a Hewlett-Packard Co. 2000, among other systems, but the system that fit the bill was a Digital Equipment Corp. PDP-11/35 timesharing system, with service for the system coming from Albuquerque, N.M., 230 miles away. Service has been excellent, in spite of the distance involved.

Purchased software included a data base management system, student record system, attendance system, payroll package and general ledger and budget reporting. A number of administrative data bases have been added, including student financial records, plant management and personnel files.

The hardware cost about $80,000; with software the system cost about $110,000.

The hardware arrived in July 1975 and, by August, the second summer registration was done on-line. The instructional and library application began in September and by January 30 the first payroll had been run.

The college attributes its success to several factors, including good local support and personnel, good software support, reliable hardware and a good data base management package. In addition, it had a specific software implementation strategy and users with good ideas of what they needed and wanted.

In the area of software support, New Mexico Military Institute, from whom the student record system was obtained, has done an outstanding job of supporting, enhancing and explaining whatever has been asked of them.

The data base management system came from Poise Co., a Roswell, N.M., firm.

About a third of the students on campus have used the system in the year and a half since implementation.

Because the college serves the special needs of a population for many of whom English is a second language, some special programs have been written. One word game customized for an instructor's requirements has been used to enhance individual and group English vocabulary instruction.

In addition, students use the system for recreational game playing, to gain familiarity with the terminals and to develop better reading skills.

The college also uses Huntington II packages which contain a number of simulations. They have been used in the nursing and biological sciences programs.

A chemistry instructor has written most of his own coursework in Basic-Plus and a few students have written their own programs to help with homework assignments.

Roth is chairman of the Computer Science Department at Taylor University in Upland, Ind., and served as a consultant in setting up the system at Navajo.

Nova-Based Turnkey Designed for Business

MOUNTAIN LAKES, N.J. — Mini Business Systems, Inc. has an entry-level turnkey system designed for business users.

The turnkey, based on the Data General Corp. Nova minicomputer, includes software for order entry, billing and sales analysis. Inventory control, purchase orders, open item accounts receivable and payable, general ledger and financial statements as well as payroll applications can be performed on the system, the firm noted.

Industry application-oriented programs for manufacturing, construction and distribution are optionally available as well, the firm said.

Hardware includes a 32K-word Nova CPU, CRT, 10M bytes of disk and a Dasher printer. With general application software, the system costs $39,990. Leases are available.

Mini Business Systems, Inc. is at 100 Route 46, Moutain Lakes, N.J. 07046.

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1977 Semiconductor Outlook Estimated 20% Above 1976

PALO ALTO, Calif. — Sales by U.S.-based semiconductor companies this year will climb to $4.1 billion — nearly 20% above the 1976 record output, according to a three-year forecast by the Western Electronics Manufacturers Association (Wema).

The rise will continue at a slower pace through 1978 and 1979, based on data compiled by Wema's Semiconductor Industry Group.

Sales in 1968 are expected to grow 12% to $4.6 billion and then increase 9% to $5 billion in 1979.

Rebounding from a depressed year in 1975, U.S.-based semiconductor firms' shipments during 1976 jumped more than 30% to a record total of $3.4 billion. For the first time, shipments of integrated circuits exceeded discrete devices, Wema indicated.

U.S. companies are expected to garner about two-thirds of the 1977 total world market of $6.1 billion. About 67% of these sales will go into U.S. consumption. Western Europe will consume about 20%, Japan about 5% and the rest of the world about 8%, Wema predicted.

The forecast anticipates sales of discrete devices to reach $2.8 billion in 1977, of which U.S. companies will capture 57% of the market.

Digital bipolar integrated circuits will grow to $952 million, with 80% of the market going to U.S. companies which will also have 80% of the $1.5 billion market for digital MOS circuits and 70% of the $744 million market for linear integrated circuits, Wema added.

Inventory of Federal DP Gear Available in Print or on Tape

WASHINGTON, D.C. — The General Services Administration (GSA) has published its "Inventory of Automatic Data Processing Equipment in the U.S. Government" for fiscal year 1976.

Compiled by GSA's Automated Data and Telecommunications Service, the inventory can be ordered on magnetic tape for $125 or in printed form (stock number 022-001-00067-1) for $7.05 from the Superintendent of Documents, U.S. Government Printing Office, 710 N. Capital St., Washington, D.C. 20402.

CW Survey Shows

Vendors Divided Over System 34 Impact

By **Esther Surden**
Of the CW Staff

Although IBM is pitching its System 34 to both first-time users and to large companies for distributed processing, vendors who sell potentially competing systems vary widely in their assessments of the impact the system's introduction will have on their markets.

"We do not feel the System 34 will impact our momentum" since the firm has a large installed base that generates referrals, according to Ted Smith, president of Basic/Four Corp.

The 34 will, because of its aggressive pricing, be a "more nearly competitive product at one stratum" of small systems, he said.

Basic/Four's small business systems product is strong, he noted. "The IBM system will compete with the Model 400, but is not in the same class as the 40M-byte Model 600 or the 300M-byte 700."

In competition with transaction-oriented systems from independents, IBM has not had a good track record and its attempt at transaction processing with the System 3 Model 4 was not successful, Smith said.

However, Smith added, Basic/Four "realistically expects to enjoy its normal percentage of the market."

'Validation' of Importance

Wang Laboratories, Inc. viewed the introduction of the 34 as a "validation of the growing importance of the small computer market as an entity within the computer industry," according to a Wang spokesman.

The announcement will accelerate the market's growth, he said.

The 34 marks IBM's attempt to regain market share "that had been eroded recently" by independents, the spokesman continued. The market share has characteristics only a few vendors can support — the need to provide direct user sales/-support and service.

"Competing with IBM means being able to offer more performance, broader options, lower prices, faster delivery," as well as the user support "for which IBM is famous," the spokesman stated.

An NCR spokesman commented that the System 34 acknowledges that the demand is not so much for small systems, but for small interactive systems. NCR generally feels it will benefit from IBM's entry into the market.

The company cited its Cobol language and expansion capability as advantages it has over IBM and added that it plans to provide a smooth migration path for users who want to move from their 82/50 minis.

Limited Input

Qantel Corp. has "had the biggest week in the history of the company," since the introduction of the System 34, according to Noel Kile, vice-president of marketing. "I don't know if the prospects were waiting to see what IBM had or what," he said.

The impact of the announcement will be limited for Qantel, he said, because "a small- or medium-sized company doesn't get in front of the buyers to begin with. If the firm were shipping 500 systems each month, it would be different."

"The 34 brings IBM a lot closer in capability to what everyone else is selling," according to Saul Dinman, executive vice-president at GRI Computer Corp.

"I don't think it will affect our business so much as IBM itself affects our business — there are some people who won't buy anything but IBM," he said.

The GRI-99 competes with the IBM 3. Pricing for the system might be much closer to competitive, he added.

Datapoint, a company in the position of marketing both a first-time user system and a distributed processing system, called the System 34 "probably the most serious product [IBM has] brought to this marketplace.

"If it does everything it is purported to do, it will be a much more effective product than the 3790 in the distributed processing environment," Ed Gistaro, senior vice-president of marketing, said.

"I think it's important that they [IBM]

(Continued on Page 52)

Future Shock Predicted for Users As Myths Around SBS Explode

By **John P. Hebert**
Of the CW Staff

ATLANTA — Although IBM's competitive joint venture into AT&T's domain may be good for communications users, the giants may decide to switch rather than fight — leaving users high and dry.

This future shock was detailed by A.G.W. (Jack) Biddle, president of the Computer & Communications Industry Association (CCIA) at a recent communications conference here.

Biddle and Harry Newton, an independent telecommunications marketing consultant, gave attendees of a session on "SBS Perspectives" a glimpse of the future implications of Satellite Business Systems' (SBS) entry into the communications field.

Newton laid the groundwork for Biddle by exploding some myths about the joint venture by IBM, Comsat General Corp. and Aetna Life & Casualty Co.

SBS won approval for its proposed satellite network from the Federal Communications Commission (FCC) on the basis of myths, Newton charged.

One of these commonly held myths is that SBS will not use much IBM equipment in the network. Quite the contrary is probably true, according to Newton.

Another myth, he said, is that SBS's customer-premise earth stations have been estimated to cost $330,000, whereas they will cost about $392,000 per earth station.

One of the SBS network's major advantages, however, is that "SBS will force AT&T to get off its butt to provide users with better service," Newton said.

Financial Growth

Noting IBM has been growing at a 14% compound rate since 1945, Biddle estimated IBM will have to make $32 billion by 1981 and $64 billion annually by 1986.

Meanwhile, AT&T will make $70 billion in 1981 and $140 billion in 1986, considering its present growth rate, the CCIA president added.

"What this will mean," he said, "is that a lot of bucks will come out of your pockets," he told the attendees.

SBS, on the other hand, has projected its revenues in five years to be $5 billion, but a conservative, independent estimate places its revenues in the $10 billion to $15 billion range, Biddle said.

"SBS' major thrust will be to knock Xerox out of the box again and cut into AT&T's revenues," Biddle predicted.

Congress, he said, won't understand the emerging technology, so the user must find a way to communicate with elected representatives.

(Continued on Page 58)

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Small Business Systems Vendors Split Over System 34 Impact

(Continued from Page 51)

felt the necessity to come up with a product like this," Gistaro said.

"We put a very heavy emphasis on the general-purpose capacity of our line and its compatibility — the ability to have identical file structures on diskettes, cartridge disks, mass storage disks and the ability to access the files with a central system no matter if it's on a diskette or on a mass storage disk," he explained.

Compatibility "is a really nice defense against IBM," Gistaro said, because [IBM keeps] going the other way."

The small systems group at Univac would only say that it feels it has a head start on IBM, "in as much as the BC/7 is an interactive system that is being used today" as opposed to IBM's which will not be available for some time.

Minicomputer Systems, Inc., a minicomputer turnkey house, viewed the introduction of the 34 as "the first real step IBM has taken into our business." It has "established our credibility for once and for all," William R. Doniger, executive vice-president said.

"The main mitigating factor is that the market is expanding so rapidly that companies like us will continue to do well," he said.

Another turnkey manufacturer, STC Systems viewed the 34 as "the usual endorsement of a marketplace many years after" it has existed according to Al Franco, vice-president of marketing.

Franco said he feels the level of support a turnkey company can provide is so great that even IBM can not touch the services necessary.

Those vendors in the distributed systems marketplace available for comment concurred that the System 34 does not compete with their systems.

Ivan Socher, general manager of the Commercial Systems Division at Computer Automation, Inc., does not think the 34 was intended to work in a network because if it were designed for large-scale networking, it would have been put in the Data Processing Division rather than the General Systems Division.

Socher also noted the IBM system is much smaller than CA's Syfa distributed processing system.

William Moore, vice-president for domestic operations at Inforex, Inc., said he believes that IBM is aimed at small users with a fairly low-cost system. "Our system 7000 is neither small nor low-cost," so the system would not be in competition with the 7000, he said.

"Everybody is jockeying for position — it's like starting the Boston Marathon. There are 3,000 of us out there and everyone is trying to figure out where he wants to run," Moore added.

Inforex has found its nitch in the marketplace, he indicated.

"I think [the System 34's] emphasis will be as a stand-alone system," according to Paul Jolicoeur, director of marketing operations at Mohawk Data Sciences.

"It does not appear to be geared towards the production data entry environment where our principal business is today," he said, adding the system's introduction will not affect the firm.

NASD, Itel Announce Joint Trading Pact

SAN FRANCISCO — The National Association of Securities Dealers (NASD) and Itel Corp.'s Data Services Group have announced a cooperative program between NASD and Itel/AutEx, a trading information system for securities brokers and institutions which supplies data to facilitate block trading of securities.

There are several elements to this joint effort.

The NASD plans to form a committee from AutEx subscribers to develop rules and standards of performance and to recommend approaches to fulfill NASD's regulatory responsibilities.

Towards this end, Itel/AutEx has agreed to provide weekly reports of trading activity within its system to the NASD along with other special reports as requested.

In addition, the firms have agreed that the NASD, through its Nasdaq subsidiary, will offer the AutEx Block Trading Information System to broker-dealers via Nasdaq Level II and Level III terminals.

Itel/AutEx will also offer Nasdaq services to its Itel/AutEx institutional subscribers.

In line with these efforts, Itel/AutEx has agreed to develop a pricing structure in an effort to make the service attractive to smaller broker-dealers.

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Datapoint Sees Growth With Innovative Techniques

By Toni Wiseman
Of the CW Staff

SAN ANTONIO, Texas — Datapoint Corp. is still in a growth phase because the market it serves is still expanding very rapidly. In fact, the firm expects to grow at a faster pace than DP in general for the next three to five years, according to Harold O'Kelley, chairman and president.

Competition is not as serious as it seems on the surface, despite the fact distributed data processing has become a favorite buzzword for many vendors, O'Kelley indicated.

O'Kelley views Datapoint's competition as three-tiered. On the first level are IBM and other mainframers who, although they have stuck primarily to their own business and will continue to do so, have offered some specialized products.

On the second tier are the classical minicomputer companies Digital Equipment Corp., Data General Corp. and, to a lesser extent, Texas Instruments, Inc. and Hewlett-Packard Co.

These firms are generally entering distributed DP as a sidelight to their main businesses and on the average haven't shown an inclination here or abroad to do any risk leasing, O'Kelley said. And risk leasing is a way of life, at least domestically.

Finally, the independents such as Sycor, Inc., Data 100 Corp. and Four Phase Systems, Inc. make up the third tier.

"Here again, their products tend to be more specialized in terms of functions. Our product line is much broader, much more complex with capability through software," he said.

Growth Prediction

O'Kelley expects the market to grow between 20% and 30% for the next five years and he would like to maintain his firm's market share. But since it is difficult to define the distributed DP marketplace, it is almost impossible to pinpoint a firm's share, he indicated.

In the first half of the current fiscal year, international sales accounted for 41% of total revenues, domestic for 59%. "There's been a bit of gradual shift from international to domestic due mainly to the fact that we do leasing in the U.S., so we have a revenue stream built under the domestic operation," he said.

According to O'Kelley, Datapoint's aim is to use existing technology in clever ways to make good products.

"It would be possible for anyone to attack us directly, for instance, by coming out with a general-purpose business computer system capable of both stand-alone and complex network operation. To date, no one with appreciable resources has decided to do this," he said.

"But if they did, it could hurt us," he admitted

Datapoint has always had a very high regard for human factors engineering, according to Jonathan E. Schmidt, vice-president, advanced product development.

This has been true from the very beginning when Datapoint began manufacturing teletypewriter replacements in 1969. In fact, he said, the firm spends at least twice as much as any of its competitors on the keyboard and CRT alone.

"The guts of a machine are minimal. Computers and memory are cheap. What you have to sell is the capability," Schmidt said.

"We go into an environment which is not a computer room so we have to be ready for coffee on the keyboard, static electricity, humidity and dust. We also have to ensure that the user will be comfortable and want to use the product. So, we start with a clay mock-up of every product and gradually put in the electronics," he explained.

"If a person doesn't want to use a machine, he can find more ways than you can imagine to sabotage its integration. The product can become an impediment to processing rather than a solution."

"Making something functional is easy. Making it appealing so we won't be rejected by antibodies in the office is something else," Schmidt indicated.

The second aspect of Datapoint's product development is that it doesn't believe in indulging in product fights with the competition, Schmidt said.

"When [the users] decide that what we're doing is what they want, we generally find a substantially different way to appeal to that market," Schmidt stated.

For example, Datapoint was the chief supplier of teletypewriter replacements for 1 to 1-1/2 years, he said. But when Beehive, Infoterm, Hazeltine and Delta Data came along, many with specialty items, Datapoint developed the 2200.

A general-purpose machine, with general purpose operating software and enclosed media was a novel idea then, Schmidt noted.

"We don't change every year like some mini companies," Schmidt said. "We're more like Cadillacs or Mercedes; we have user loyalty. People hang on to their machines and we continue to support them so they retain their value," he said.

Datapoint doesn't intend to have a major portion of its costs in state of the art "where it is only out there for spacemanship," he added.

Marketing Strategy

Datapoint's marketing strategy lends itself to dealing with large dispersed users, according to Ed Gistaro, senior vice-president.

Some manufacturers have approached distributed DP with a myriad of products for each specialty which are characteristically not hardware or software-compatible or are highly host dependent, he noted.

"This is a very smart strategy for IBM," he noted. "If you had 70% of the market, would you be interested in shrinking the number of dollars in that market, which is what distributed DP does?"

Gistaro feels his firm is in a good position because the people involved in distributed DP are not "computer freaks. The computer is not the end-all for them and they are not loyal to IBM."

At the other end of the spectrum, Gistaro feels that Datapoint is healthy in peer competition because most others have not invested long years in building up a line of products from one common software as Datapoint has.

"Datapoint's principle strength is compatibility. We can ask the customer what he is trying to do, what he would like to do and we have confidence our product line can be tailored to the problem because it is so diversified," he stated.

"The only hitch might be that he wants to do more at one site than we can handle."

"We just don't have the power to do some things customers want," he said, adding future announcements will remedy that.

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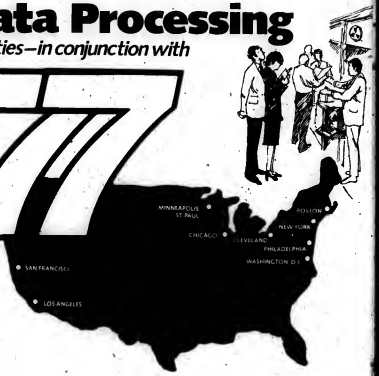

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Add-On Memory Business Remains Attractive to Intel

By Toni Wiseman
Of the CW Staff

SANTA CLARA, Calif.— Intel Corp. last year produced and sold integrated electronic devices that contained a hundred times more transistors than had been used in the entire world during the two decades from the invention of the transistor to Intel's founding in 1969, according to the company.

The cost of a transistor in many electronic functions has decreased several thousand times since the early 1960's, as well.

Many of the integrated devices Intel sold last year were integral parts of the memory systems the firm produces, the firm said.

Intel will definitely be coming out with a 370/138-148 memory with a universal box approach no later than the first quarter of 1978, according to an Intel spokesman.

Intel is also the only company, he said, which has an add-on memory for the 370/125—a product based on a 16K memory chip which no one else is presently using in end-user systems.

"We are also renting the product, as opposed to leasing or selling. This is the only system we rent, but it is a market requirement because most 125 users rent rather than buy or lease their machines," he pointed out.

"We have several firsts in that product line and orders are good," he said. "But this is an area where we will have to make price adjustments because we were not very much lower than IBM in price initially and now are higher in some instances."

User Reluctant

In the past, users have been reluctant, in many cases, to purchase independent gear because they didn't attribute any residual value to it, the spokesman indicated. This meant that the independents' price minus the Investment Tax Credit (ITC) to be less than the price from IBM minus the ITC plus the residuals.

"But this differential need not be as great as it has been in the past since IBM has shown its residual value is not set," he said.

Intel is already shipping charge coupled device (CCD) memories to OEMs, but does not intend to get into bubble memories, at least not at this point, the spokesman said.

"We have a staff of engineers and scientists who know what is going on and who keep up with the technology. But bubbles are just not fast enough for today's storage applications.

"Bubble memory is okay for a telephone dialer application, for instance, but the technology will require a lot of improvements to make bubbles a practical and economic storage device," he stated.

CCD memory has an advantage in that it is based on semiconductor technology, which has tremendous momentum behind it, he noted. "There have been hundreds of memory technologies, but almost all have lacked momentum," the spokesman said. "The fact that we are making and shipping CCD memories will sustain that momentum," he added.

The 370 add-on market was $20 million in 1974, $40 million in 1975, $90 million in 1976 and is projected to reach more than $110 million in 1977, the spokesman indicated.

And, while the memory market is very elastic, there are practical limitations as to how much can be manufactured and sold, he said.

"Every time IBM announces a new machine, the total of potential memory sales is greater than the total independent market," he indicated.

For instance, consider the hypothetical case of 5,000 sales of 370/125s, each capable of growing to 512K. Even if each system only grows to 384K, that potential, minus the 64K minimum configuration from IBM, creates a potential market of more than 1.5G of memory, or in excess of $150 million, theoretically available to independents, the spokesman explained.

That potential market is what makes the add-on memory business so attractive; the potential for profit is there, he maintained.

Then why haven't more companies ventured into the business? "IBM encourages its users to lease and rent their memory," the Intel spokesman said. "This puts a severe constraint on smaller companies. There aren't many companies that can afford to lease, but it's tremendously profitable if you can do it," he noted.

At year-end 1976, for example, the average remaining lease was 82% of the total lease contract and significantly more than the remaining undepreciated value, which was 69% of the total cost of manufacturing and installing the equipment.

Thus, the profitability of the lease business increases with the age of the lease, the spokesman pointed out.

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Adapso's Cooperation Urged in Effort To Impact Social, Economic Conditions

WASHINGTON, D.C. — The DP services industry will have an enormous impact on the social and economic conditions in various countries.

And there is a need to conduct business in a "more orderly, clinical way," removed from the mystery still shrouding some areas of DP, according to "Tony" Helmer, president of the European Computer Services Association.

Cooperation does not preclude competition, he told members of the Association of Data Processing Service Organizations (Adapso) at the group's recent meeting here.

Helmer invited the attendees to meet in Barcelona, Spain, in June 1978 at the first World Computing Services Conference to discuss opportunities and problems in better serving mankind.

The purpose of the international meeting is not necessarily to talk of commercial cooperation since it is essential to preserve competition, he noted.

For without competition the advantages of DP "are at best delayed and at worst lost," he said. Also, many companies are not interested in international operations, nor should they necessarily be, he continued.

But the cooperation and exchange should be applied to many areas such as privacy legislation.

For instance, some European countries have passed legislation in this area that is almost impossible to observe and still do business, he said.

One forthcoming regulation will nearly require a specialist in privacy at each computer site, he said.

The audit function of data will have to be introduced in administrative laws, and the DP services industry "may be the vehicle to fulfill such a public function," he remarked.

Helmer called on Adapso to industrialize software and give it transportability and standardization.

At the Barcelona meeting, the assembly of firms from several countries should make an inventory of what needs to be done to fulfill the industry's duties and responsibilities to the outside world, he concluded.

The industry must ensure that DP is used to protect privacy, but not to the point of repression of business, and to improve the management of society, but prevent terrorism, he indicated, citing a list of ways in which DP can affect the quality of life.

Adapso Gets Foreign Flair

WASHINGTON, D.C. — The 46th Management Conference of the Association of Data Processing Service Organizations (Adapso), held here recently, took on an international air, reflecting attendance by people from a total of 13 foreign countries.

In many cases, numerous firms from a country were represented. Sweden and Denmark each had three firms attending the conference, following Canada, which had five, and England with four.

Among the foreign countries represented were Finland, Denmark, Japan, Norway, France, England, Canada and Spain.

The Netherlands, Sweden, Northern Ireland, Italy and Belgium also had representatives attending the conference.

International News

Program Helps Conduct Business With Soviets

MILL VALLEY, Calif. — U.S. businessmen thinking about doing business with the Soviet Union or Eastern European countries may be interested in an audio cassette program entitled "The Red Tapes: Commentaries on Doing Business with the Russians."

Designed for in-house seminars and executive training by Westshore, Inc., the program provides eight hours of commentary by seven American Sovietologists.

The topics include Soviet foreign policy and trade; dealing with Eastern Europe; how things work in Moscow; contract negotiations; the Soviet economy, how it works and why; the current situation in energy and technology; how the Soviets do business and what they need and want from the West.

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Another new terminal, the ultimate "have-it-your-way" design, should be extremely popular with OEMs. You can pick and choose from a variety of hardware modules, and write your own firmware. Everything plugs together for a virtually custom display station.

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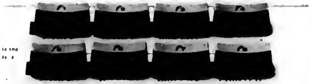

The "soft keys" on our smartest terminals let you execute complex operations with a single keystroke and eliminate many repetitive jobs.

Problems? The self-test key helps pinpoint them for you.

Chilean Market Small, But Ready to Boom

SANTIAGO, Chile — The Chilean market for DP equipment "is at the doorstep of a large expansion," according to the U.S. Department of Commerce.

Chile's present DP budget is only in the range of $20 million to $30 million a year, but that is likely to double in the next six to 10 years, with U.S. suppliers emerging as virtually the sole source of equipment, Commerce predicted.

Major potential competitors such as Japan and West Germany may, however, enter the market in the coming years, the department warned in a market survey report.

"The most promising lines of products in the local scene are small business computers and terminals of varied sorts. These will be demanded mainly by the private business sector," Commerce noted.

"The latter is in the process of modernizing its operational systems after years of import prohibitions and economic restrictions which are now being lifted."

Chile imported $5 million in DP equipment in 1975, $35 million in 1975 and $18 million in 1976. The U.S. share in each of those years was 75% of the market, according to Commerce figures.

International News

In terms of domestic competition, there are no Chilean firms engaged in the manufacture or assembly of computer hardware. In software, there is very limited production of canned programs and punch cards, the Commerce Department report said.

CPUs account for about 85% of total sales to Chile today, with terminals and other accessories accounting for about 14%, the report stated.

"It is considered that by 1980 terminals and accessories will account for more than 50% of the total sales, at the expense of sales of central units," Commerce indicated.

The report further noted the Chilean market is not a favorable one for minicomputers because of price considerations.

Foreign Orders & Installations

Long John International Ltd. has installed a Honeywell Series 60 Level 62 system at its Glasgow headquarters for controlling the storage, marketing, selling and distribution of Scotch whisky.

Constructors John Brown Ltd., a UK process engineering and contracting group in London, has ordered a Univac 1100/11 system to provide interactive service for its engineering and technical departments.

Mexicana de Papel Periodico has ordered a Measurex 2000 digital process control system for Mexico's third newsprint mill, which is now under construction at Tres Valles.

The European Incoherent Scatter Facility (Eiscat), a European research organization, has ordered three Nord-10 systems from Norsk Data A/S for operating radar transmitters and receivers at three sites in Finland. Eiscat is studying the Northern Lights by measuring different layers of the ionosphere.

Karstadt, a German department store group, has ordered NCR Corp. point-of-sale systems valued at $3.3 million.

The Australia and New Zealand Banking Group has ordered Incoterm Corp. equipment for the pilot phase of its New Zealand Branch Banking System, which will include inquiry/response and transaction control applications.

The National Bank of Iran, the largest commercial bank in Iran and the Middle East, has ordered a Univac 1100/12 multiprocessor system to process batch applications and to be used to develop and implement a pilot on-line real-time teller system.

Maritime Telegraph and Telephone Co., Ltd. of Halifax, Nova Scotia, has installed a Facilities and Equipment System from Computer Consoles, Inc.

Avions Marcel Dassault-Breguet Aviation, a French private aircraft manufacturer, has ordered three SEL 32/55s from the French subsidiary of Systems Engineering Laboratories. A dual SEL 32/55 configuration with shared memories will enable test engineers to acquire and process information from two aircraft flying simultaneously. It will then transmit test data to the third SEL 32/55 for reduction and computation.

The University of Carabobo in Valencia, Venezuela, has ordered a Burroughs Corp. B6700 system, five B771 system and communications processors and 25 TD 800 terminal systems.

Trans-Australia Airlines, based in Melbourne, has ordered an additional Univac 494 system and an 1100/11 system which will facilitate implementation of a corporate information plan.

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Don't Forget Bottom Line

Rapid Growth Could Endanger Services Area: Mintz

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — DP services is a "dynamic industry fraught with opportunities and profits to be harvested." But "growth for growth's sake is suspect," and firms should pay attention to the bottom line, according to Gilbert Mintz, president of Broadview Associates.

As a result of business' philosophy that bigger is better, profits are receiving less attention than they deserve, Mintz told over 300 attendees of the Association of Data Processing Service Organizations (Adapso) management conference here.

One should not allow growth at a pace faster than that with which one can cope, he warned.

A smaller staff is more easily managed and is potentially more efficient, he said, citing numerous pitfalls of rapid growth, which represents the "perfect excuse for everyone."

Not Enough 'Doing'

For instance, there is a tendency for middle management to grow and spend too much time planning growth and not enough time "doing," he noted.

The press for growth often brings marginal pricing, he pointed out. Revenues tend to be overestimated and the expense stream underestimated, he continued, adding "expenses flow upward to meet revenue."

In addition, it is difficult to measure performance. "How often have you converted a great operator into an awful supervisor?" he asked.

And then there's the "witch doctor syndrome" of the employee who has special knowledge about some particular aspect of work and is "indispensible," he said.

"We also tend to forget computers are finite in their capacity," he said.

But the DP services industry has several strengths. It has a continuing revenue base, which is a marvelous asset, and a relatively long product life.

The cash flow is good and the industry is not capital intensive compared with other industries, Mintz stated.

It is also not seasonal, and management can plan its work flow.

Pure Price Elasticity

There's a limited amount of pure price elasticity since selection is seldom made on the price alone, he continued.

The industry has demonstrated its ability to grow even in poor economic climates.

There also is the leverage factor, Mintz indicated. In other words, as routine work becomes less attractive, the need for DP grows.

Citing the "inertia factor," Mintz said people forget how to do the work internally and "become hooked on the service.".

DP services has become legitimized and no longer has to make a two-tier selling effort — first convincing firms to let their data outside and then selling on the merit of its service.

The improved price performance in DP equipment has helped the industry tremendously, he said.

The services arena can buy gear, add value and sell to the public, whose prices are determined by the rising costs of labor, he added.

Future Shock Seen: SBS Myths Explode

(Continued from Page 51)

"If not, then you may as well take your budget dollars and tell someone else to handle the communications functions. If questions concerning SBS services go into regulatory committees, you're in trouble," Biddle warned.

Other Alternative

The other alternative is to leave the problems for the "giants" to solve, Biddle said.

There will be a convergence of technologies in the next few years. The two industry gorillas — IBM and AT&T — will get together to decide who will provide different communications services, Biddle stated.

"They will not fight it out; it will be easier to join 'em," he said, cautioning that when this happens the user will be out because he will have no other choice.

Data communications is rapidly becoming a vital part of business, Biddle said. There will be no way to optimize communications functions if there are no independent vendors.

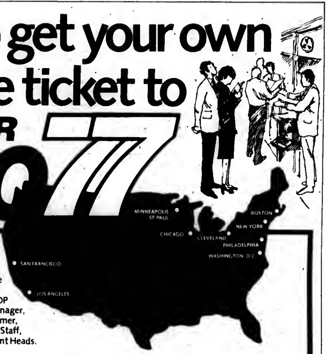
SBS can bring new innovations and new opportunities in services that will be available to all, Biddle said. "Let's make sure that it stays that way," he added.

The Consumer Communication Reform Act is AT&T's way of limiting SBS before it is under way, but IBM wants to wake the sleeping giant and challenge AT&T to develop timely equipment, he concluded.

Milestones

The computer industry has matured to the point where firms are reaching milestones in terms of shipments and installations at a rapid pace. For example:

- Shugart Associates shipped its 60,000th drive.
- Tektronix shipped its 10,000th Model 604 Display Monitor, to Medical Data Systems Corp.
- Datapoint Corp.'s orders for the Infoswitch long-distance telephone control and accounting system passed the $1 million mark.
- Hewlett-Packard shipped its 10,000th CRT data terminal. The HP 2645A was shipped to Amdahl Corp.
- Applied Data Research completed its 6,000th IBM 360/370 software product installation.
- Pansophic shipped its 100th multimedia training course, "Basics in Easytrieve," to Litton Computer Services.
- University Computing Co. has sold its 500th UCC One tape management system software package, to PPG Industries.



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Shugart Drive Shipments Ahead of Plan

By Esther Surden
Of the CW Staff

SUNNYVALE, Calif. — Shugart Associates is growing faster than its optimistic management ever predicted, and the prospect for ever-increasing growth is very real, according to George H. Sollman, director of product management for the firm.

"We're thinking in terms of having sold 100,000 drives by the National Computer Conference [in June]," Sollman said. Presently, the company is shipping $2 million worth of disk drives out the door every month, he noted.

Shugart was fully profitable by the end of April 1976, Sollman stated. Its first shipment was in September of 1973 and presently the firm has shipped over 80,000 drives.

Shugart currently has 325 employees and its income should exceed $25 million this year, he added.

Of its products, the SA800 is averaging 6,000 shipments each month with the Minifloppy averaging 2,000 per month. The Minifloppy is going 40% to the hobby market, 40% to word processing and 20% to that nebulous area marked "others," Sollman said.

The Minifloppy is gaining popularity in the hobby market because "it is far more sensitive to cost."

The word-processing market has adopted the small-sized floppy because it can be easily put into a desk-top unit, he claimed.

The 800 disk drive goes into small business systems, intelligent terminals, word-processing systems and microcomputer development systems, he noted.

"Data entry was the reason most floppy drive makers gave for going into the market, but most data entry devices were leased and their developers did not quickly go to the floppy disks," he continued.

"We've doubled our shipments since last June," he added. Shugart started out with $1 million in revenues the first year with a loss, $2.5 million the second year with a loss and was profitable in 1976, he said.

No one product takes more than 15% of the marketplace, Sollman noted. Shugart's major competitors are Control Data Corp., California Computer Products, Inc. and Pertec, he noted.

Contracts

Gould, Inc. has received a contract from System Development Corp. for Gould Model 5200HS high-speed electrostatic 16-channel analog recorder/digital printer plotters.

Tandberg Data, Inc. has been awarded a contract by the General Services Administration for the firm's TDC 3000 digital cartridge recorder.

Datacrown Ltd. has signed a three-year DP services contract with Nabob Foods Ltd.

Raytheon Service Co. has been awarded contracts for third-party computer maintenance service from Storage Technology Corp., National Sharedata Corp. and Metro Systems, Inc.

Relational Memory Systems, Inc. (Relms) has received an OEM contract from Zilog Computer Corp. The contract calls for delivery of the Relms Z80-SAM system adaptor module.

National Semiconductor Corp. has been awarded a multimillion dollar contract by Ford Aerospace and Communications Corp. for over 3,500 custom-designed memory systems.

Datacrown Ltd. has received a five-year DP services contract for Liquid Carbonic Canada Ltd.

AAA Technology has signed a 10-year contract with Proctor & Gamble Co. The contract covers the installation and engineering support of its Triflex Piping System Analysis and Design Program on Proctor & Gamble's two IBM 370/168 computers.

Hazeltine Corp. has received an Automatic Vehicle Monitoring System contract from the City of Dallas to be used by the Dallas Police Department.

Beehive International has received an OEM contract from Collins Commercial Telecommunications for delivery of Beehive's B300 and B400 terminals over a two-year period.

Systems Engineering Laboratories, Inc. has been awarded a contract from the U.S. Air Force to provide automatic DP systems (ADPS) to simulate F-4E and RF-4C aircraft weapon systems operations.

Keane Associates, Inc. has received two management contracts from St. Clare's Hospital and Health Center in New York City and Franklin General Hospital Center, Valley Stream, N.Y.

Contrac Corp. has been awarded a contract from Trans World Airlines to supply and install an Intelligent Flight Information Display Systems at the airline's St. Louis terminal.

Western Union has been awarded a contract by the National Aeronautics and Space Administration to provide satellite communications services over a 10-year period beginning in 1980.

Raytheon Service Co. has been awarded contracts for third-party computer maintenance services by Gilman Brothers, Inc., the Institute of Computer Science and Halifax, Inc.

Systematics, Inc. has been awarded two contracts. The first is a long-term facilities management contract from Manufacturers Bank. The second is a five-year DP services contract from First Midland Bank & Trust Co.

Acquisitions

Motorola, Inc. has agreed in principle to acquire **Codex Corp.** Subject to approval of the agreement, each outstanding share of Codex common stock will be exchanged for 1.125 shares of Motorola common.

Telex Computer Products, Inc. has acquired for cash all of the assets of **Gulliver Technology Corp.**

Precision Instrument Co. and **MRI Systems Corp.** have discontinued discussions of a merger.

Datapoint Corp. has agreed to acquire **Amcomp, Inc.** for $2 million in cash.

Alanthus Corp. has acquired **Leasco Data Communications Corp.**, a terminal-leasing subsidiary of Reliance Group, Inc., for $3,650,000 in cash and a 12% five-year note for $675,000.

London Life Insurance Co., London, Ont., has acquired **SDI Associates Ltd.**, a Toronto-based data services company.

Computer Audit Systems, Inc. (CAS) has signed an agreement of merger with a subsidiary of the **Cullinane Corp.** to become a subsidiary of Cullinane. The agreement, which calls for a cash payment of 40 cents per share to CAS stockholders, will become effective upon approval of CAS' stockholders.

A.C. Nielsen Co., international business services firm, has agreed in principle to acquire **Coordinated Management Systems, Inc.** for marketing applications.

Data Dimensions, Inc., International Computer Equipment Corp., and **National Terminal Corp.** have terminated their acquisition discussions.

Dow Jones & Co., Inc. has agreed in principle to acquire a 30% interest in **Extel Corp.**, a telecommunications equipment manufacturing firm, for an undisclosed amount of cash.

Advanced Computer Techniques Corp. has agreed in principle to acquire R. Angus Computer Services, Ltd.

Automatic Data Processing, Inc. (ADP) has acquired **Financial Computer Corp.** for 36,000 shares of ADP common stock.

U.S. Datacorp, a supplier of computer output microfilm, has acquired all assets of **BT Data Corp.**, a company which specializes in the conversion of computer data to microfilm.

American Television and Communications Corp. has agreed in principle to acquire Wyly Corp.'s subsidiary, **Microwave Transmission Corp.**, for an undisclosed purchase price.

National Computer Systems, Inc. has acquired the **Opscan Division** and the **Precision Business Forms Division** of Optical Scanning Corp. for an undisclosed amount of cash.

Comshare, Inc. has completed the acquisition of **Trilog Associates, Inc.** with the issuance of 122,500 shares of Comshare common stock.

Univac's ISS operation acquired the design, manufacturing and marketing rights for the Series 2500 disk memory system from **National Micronetics, Inc.**

Motorola, Inc. has acquired **Codex Corp.** for $80 million in stock.

Ketron, Inc. has acquired **Information Technology, Inc.**

Expansions

Electronic Memories & Magnetics Corp.'s **Computer Products Division** has opened an East Coast facility in Bedford, Mass.

Innovative Computer Products has moved to larger facilities at 18360 Oxnard St., Tarzana, Calif. 91356.

The **Electron Devices Division** of NEC America, Inc. has moved from Sunnyvale to expanded offices at 3070 Lawrence Expressway, Santa Clara, Calif. 95051.

Operations have begun in the second building to be completed on **Hewlett-Packard Co.'s** site at Corvallis, Ore.

MRI Systems Corp. has completed its second expansion of corporate headquarters in Austin, Texas.

Reliablity, Inc. will move its international headquarters from the West Loop area to larger quarters at Park 10, Houston, Texas.

Data Display Proudcts is moving to larger quarters in a 10,500 sq-ft plant in Los Angeles.

Hughes Aircraft Co.'s **Solid-State Products Division** has leased a 52,000 sq-ft building in the Irvine (Calif.) Industrial Complex.

Boeing Computer Services, Inc. has moved its corporate headquarters to 177 Madison Ave., Morristown, N.J.

Tandberg Data, Inc. has moved to larger quarters at 4060 Morena Blvd., San Diego, Calif.

Capac, Inc. has consolidated its production force and moved to a 3,000 sq-ft building in Milford, Conn., its fourth expansion in two years.

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Financial News

At Annual Meeting

IBM Concerned With Foreign Competition

By Toni Wiseman
Of the CW Staff

NEW YORK — IBM's recent annual shareholders' meeting here went off with only minor disruptions from the floor — and some comic relief, such as a request from one shareholder that IBMers be allowed to wear colored shirts on Fridays.

The meeting was also enlivened by the presence of representatives of various church organizations and that of Wilma Soss, representing the Association of Women Shareholders.

Soss was, she emphatically informed Chairman Frank T. Cary, wearing black for the recent action of IBM stock. She expressed the hope that Cary would do something about the stock's activity.

There was some controversy over IBM's sale of equipment to countries, notably Chile and South Africa, where the equipment is allegedly used to repress the civil rights of citizens [CW, May 2].

Cary declined to comment on the future earnings outlook of the firm and on the first-quarter results, which were down from the final quarter last year. He also declined to speculate on the near-term effect of recent price reductions for IBM computers, but indicated advances in technology and manufacturing productivity continue to improve the price/performance ratio, resulting in an expansion of the computer market as a whole.

Addressing the subject of competition, both domestic and foreign, Cary glossed over competition from Amdahl Corp. and the semiconductor firms, but termed the Japanese "very, very capable firms."

He noted the Japanese government has declared its backing of DP as an export industry and cited shipbuilding, automobiles and electronics as examples of the positive effect such backing has had in the past. "We think they have good technology . . . and we are not taking the competition lightly," he said.

Cary acknowledged the largest problem facing IBM today is the Department of Justice lawsuit and other litigation.

"I am a little at a loss to say how we are trying to solve the problem except that we have excellent representation," he commented.

Referring specifically to the U.S. vs. IBM trial, Cary termed the suit an "anachronism" because of the dynamic nature of the industry. He remains "convinced that our position is just" and said he was pleased with the favorable outcome of the California Computer Products, Inc. trial.

He also observed the Calcomp "shadow jury" was "a perfectly legitimate expense, authorized by the company."

Finally, Cary indicated that while IBM has looked at the personal computer market from time to time, it has decided not to pursue it "for what I consider very practical business reasons."

Reelection of the members of the board of directors generated some activity from the floor, with one shareholder remarking there seems to be a tremendous transfer between the board and Washington, D.C.

He suggested there are too many ex-Washington people on the board and a conflict of interest might result since the interests of government and business are not the same. The shareholder recommended an ethics committee to review the situation.

Soss observed the board is "overqualified" with lawyers and nominated Anne Armstrong, former U.S. ambassador to Great Britain. Cary said he would consider the suggestion.

Evelyn Davis, a Washington publisher, noted "one more official of the Ford Administration isn't going to hurt" and recommended the nomination of William E. Simon "to offset excessive legal fees. We need someone who isn't a lawyer."

Two directors were opposed on the basis of past and present history — Grayson Kirk on his past record as president of Columbia University and William T. Coleman Jr. because "he is forcing the Concorde down on people."

The end result of the annual meeting was the reelection of the 20 members of the board of directors, the ratification of the appointments of auditors and the approval of an amendment to the IBM Retirement Plan.

Two stockholders' proposals, relating to disclosure of information on former government employees and to limiting executives' stock options, were defeated.

New Registrations

XEROX CORP., Stamford, Conn., filed to register 71,404 shares of common to be offered for sale from time to time by certain selling shareholders at prices based upon fluctuating market prices. No underwriter is involved.

GRAPHIC SCANNING CORP., 99 W. Sheffield Ave., Englewood, N.J. 07621, an information-handling service, filed to register 440,000 units, each unit consisting of one share of common and one warrant to purchase a half share of common, to be offered for sale through underwriters represented by Feherty & Swartwood, Inc., 70 Pine St., New York, N.Y. 10005 and Moppin Watson, Inc., 1 State St., New York, N.Y. 10004.

BEEHIVE INTERNATIONAL, 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125, a CRT terminal and computer systems manufacturer, filed to register 300,000 shares of common offered by the company and 186,000 offered by the selling shareholders. Underwriters are Boettcher & Co., Denver, Colo.

XIDEX CORP., 305 Soquel Ave., Sunnyvale, Calif. 94086, a microfilm firm, filed to register 700,000 shares of common of which 350,000 are being sold by Xidex and the remainder are being sold by certain shareholders. Underwriters are Kuhn Loeb & Co., 40 Wall St., New York, N.Y. 10005. Xidex is also offering $120,510 shares of common issuable upon exercise of options under Xidex's three employee stock option plans.

MINNESOTA MINING AND MANUFACTURING, 3M Center, St. Paul, Minn. 55101, filed to register 29,092 shares of common. These shares were issued in exchange for the business, assets and goodwill of BEW Photo Service, Inc. and Mira Surgical Systems, Inc. and may be offered for sale from time to time by stockholders of acquired companies who received shares at current prices at the time of sale. No underwriter is involved.

Cray Posts First-Quarter Loss

MINNEAPOLIS — Cray Research, Inc. reported revenues of $508,974 and a net loss of $487,570, or 35 cents per share, for the first quarter ended March 31.

This compared with no revenues from operations and a net loss of $290,929, or 35 cents per share, for the first quarter of 1976.

Seymour R. Cray, president, said the loss for the formative company was "anticipated and in keeping with our plan and was due essentially to increased overhead costs associated with expanded marketing and development efforts."

These costs "were devoted largely to a highly successful marketing effort which resulted in agreements with three organizations for the installation or continued lease of four computer systems," Cray said, adding this "classifies the quarter as among the most rewarding in our brief history."

A lease with Los Alamos (N.M.) Scientific Laboratories for an initial computer system was renewed for six months. The system has been installed for a year and has been on lease since evaluation.

The lease renewal calls for a 40% increase in the monthly lease, to $211,250 per month plus maintenance, and adds approximately $2.4 million to the value of the system, Cray said.

The Council of the European Centre for Medium Range Weather Forecasts authorized a contract for leasing an interim Cray-1 system for its preliminary headquarters in the UK. The council also agreed in principle to acquire a Cray-1 as the main computer in a new headquarters. This will be Cray's first overseas installation.

The U.S. Department of Defense agreed to install two Cray-1 systems with a combined value of $16 million. Installation during 1978 is contingent upon expected congressional appropriation of funds, the firm noted.

Losses are expected to diminish later this year as another machine is installed at the National Center for Atmospheric Research in Boulder, Colo., and this machine begins to produce revenue.

Nickels & Dimes

Computer Consoles has begun implementing its financing agreement with Heizer Corp. of Chicago to provide up to $1.8 million of equity financing on an "if needed" basis.

$$$

Data Processing Power has completed negotiations for $590,000 of equity financing to be used primarily for the expansion and support of its national and international network of independent sales representatives.

$$$

Royal Industries has become a wholly-owned subsidiary of **Lear Siegler** as a result of a cash merger which pays $13.50 for each of the Royal shares which remained outstanding. Security Pacific Bank has been appointed agent for payment.

$$$

General Computer Services' board of directors has voted to establish an employee stock ownership plan for company employees. The plan will purchase about 460,000 of the 634,000 shares of the firm's common stock owned by Automobile Underwriters Corp.

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Fred Zirkle
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J. Patrick McKeon
Eastern Regional Sales Manager
Graphic Controls Corp.

"Electronic Memories is very happy with the organization of the Computer Expo, and the receptiveness of the people working here. Our equipment is always in place, the people are cooperative. We're getting good exposure, and enough people through so we can see who we want to. Exhibitors should make an extra effort to attract their prospects. With what the Computer Expo did for us, and what we did for ourselves, we're very pleased. The Expo this year is well worth our money."

Norman G. Compton
Sales Manager, Micro Processor Systems
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COMPUTER EXPO77

Raytheon Passes $100 Million Mark, Targets Expansion in Four Directions

NORWOOD, Mass. — Having reached an annual rate of $100 million in the intelligent terminal, distributed processing and minicomputer business, Raytheon Data Systems Co. (RDS) is aggressively moving to expand its presence in what it considers the four most important new areas of the informatin systems business, according to RDS vice-president Joseph L. Hitt.

Those four areas are:

- Evolution of a single modular product family.
- Broad-based enhancement of communications capabilities.
- Evolution of more powerful systems, functional and applications software by industry markets.
- Widely dispersed international distribution and support capabilities.

"I would characterize 1977 as the year in which the industry will see major moves in all four of these areas by RDS. Many of our earliest steps are already visible," Hitt said.

The company's PTS-100 intelligent terminal and PTS-1200 distributed processing systems form the core of Raytheon's current product family, which also includes the RDS-500 minicomputer and a line of digital-communications controllers.

"We've shipped over 35,000 PTS-100 and PTS-1200 terminals so far and are currently at our highest rate ever," Hitt stated.

Already able to operate in a single product configuration, the PTS-100 and PTS-1200 systems are being expanded to perform even more joint functions. "We want to be first with a true single family, one in which there is no requirement to swap processors or equipment as the system expands," according to Pat Toomey, PTS-1200 product manager.

Recent Developments

So far this year, RDS has developed a concurrency capability which allows on-line transaction processing, local data entry, data validation and editing, remote job entry, file management and local batch processing on a single configuration.

It has added a Teletype concentrator capability which allows its users to run both intelligent terminals and low-speed teleprinter links on the same lines. Large-capacity disk and magnetic tape storage units have also been added and Synchronous Data Link Control (SDLC) protocol for both products is planned.

"You can expect to see more peripheral enhancements, more communications flexibility and expanded software at both a systems and applications level this year," Toomey said.

Communications a Key

In the communications area, Raytheon last month demonstrated both the Higher Level Data Link Control (HDLC) protocol and the X.25 device protocol that permits CRT terminals to communicate on-line to public packet networks.

"When X.25 is implemented on U.S. packet networks, we expect many users to begin using this form of data link since it is so cost-effective," Hitt said.

With terminals already linked to packet networks in Canada, Raytheon believes many users will add major network links using packet-switched systems. "You can build a network almost overnight with no host mainframe involvement using today's technology," Hitt believes.

The company's long-range commitment to data communications systems and products is a global interest of RDS' president, J. Thomas Markley. "There is no sector of the data communications business that isn't of interest to us. It is only a matter of time, resources and priorities that prevent us from being there today," Markley said at the recent Interface '77 show in Atlanta.

Aside from its digital communications business, the company's recent moves with HDLC, SDLC and X.25 are evidence, Hitt said, of its gradually unfolding commitment to networking solutions.

International Dimension

Organizationally, RDS recently restructured its total management approach in an effort "to reach out in three directions simultaneously," Hitt said.

Those three directions include better local customer support, a more vertical market orientation and rapid expansion of nonairlines international business.

The four-man office of the president — comprised of Markley, Hitt, David Levi and John Tincler — now runs a four-company organization consisting of Raytheon American Data Systems serving the North American market and performing almost all manufacturing; Raytheon International Data Systems (Rids) serving most of Europe, Africa, Asia and Australia; RDS Leasing Co., the internal leasing company; and Raytheon Cossor Data Systems, Ltd., a Raytheon subsidiary serving the UK and Scandinavian markets.

Part of the restructuring also included creation of a multiindustry marketing group to provide special functional capabilities, hardware products and software systems to support users in individual market sectors. Initially targeted are the airlines industry — in which Raytheon is already serving over 75 airlines — the insurance industry, banking and finance and manufacturing sectors.

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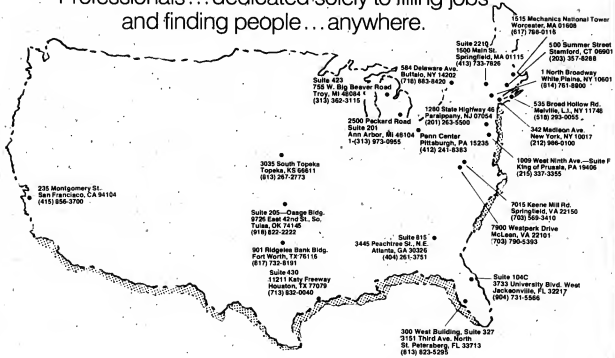

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Small innovative company seeks creative person with varied OS/TSO experience, (IMS, CICS, CMS, also helpful). Our top notch people have a lot to teach you and you should be able to teach them. It's a career opportunity in a stimulating environment for a real pro who is tired of big company politics and wants to see his ideas used. Salary open.

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Attention: Dept. CW-5
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REALTIME SYSTEMS

PROGRAMMER ANALYST

Pharmaceutical Research

REQUIRES:

1. Degree in Engineering or Computer Science
2. Expert knowledge of PDP-11 including RT-11 or RSX-11M system programming
3. 3 or more years experience in Realtime system design and programming

DESIRABLE:

1. Knowledge of data communications hardware and software
2. Applications experience in chemical or medical lab automation, or industrial process control

Creative atmosphere, liberal benefits, accessible suburban location.

Send resume to: Manager of Scientific Employment, Schering-Plough Corporation, 60 Orange Street, Bloomfield, N.J. 07003.

SCHERING-PLOUGH CORPORATION

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Experienced PDP-8 and PDP-11 programmers needed for sophisticated real-time system. Applicants should have a minimum of 2 years experience using Macro-11 in a real-time environment. Data communications experience on DOS-11 and COBOL experience extremely desirable. Send confidential resume to:

CW Box 5030.
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PROGRAMMERS & SYSTEMS PRO's $16-23K

We are management consultants who specialize in Data Processing. Our clients are top U.S. firms with progressive state-of-the-art installations in the "sunny South" & nationwide. Current positions for DP pros skilled in 360/370; Honeywell; Burroughs and DOS/VS; Data Base; CICS; IMS; On-line . . . Other openings incl Software Technicians & Support; DP Management. CLIENT FIRMS PAY ALL FEES & RELATED EXPENSE. Send resume & $$ info or call (901) 767-5150.

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- **Minimum of years (including education) in programming (COBOL and/or BAL).**
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These positions carry excellent compensation including attractive salaries and benefits, plus relocation to our Eastern Oklahoma "Green Country" — a lush vacation land offering a splendid assortment of lakes, rolling hills, forests, and prairies, plus a brand of hospitality rarely found elsewhere!

To apply, send your resume including current compensation in confidence to: Personnel Dept.

TRW **REDA PUMP**
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PO Box 1181 Bartlesville Oklahoma 74003

PROGRAMMING/SYSTEMS

Educational Institution in Central N.J. has the following positions available in the E.D.P. area.

PROGRAMMER-B.A.

or equivalent experience plus 2 to 3 years of comprehensive experience in design and preparation of programs utilizing current operating systems and multi-programming technology.

PROGRAMMER ANALYSTS

(2) - B.A. or equivalent experience plus 4 to 5 years experience in the development of applications systems utilizing current operating systems in a multiprogramming environment with a minimum of 1 year experience in systems analysis.

MIS ANALYST

B.A. or equivalent experience plus 5 to 6 years experience in design and preparation of application systems, utilizing current operating systems and multi-programming technology.

DATA BASE ADMINISTRATOR

(2)-(1 year grant) B.A. or equivalent experience plus 2 to 3 years programming experience with at least 1 year in applications systems design and analysis.

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(2) - B.A. or equivalent experience plus 2 to 4 years experience in the study of work methods and processes; systems design and preparation; data analysis; and worker D.P. support areas re input/output control, scheduling, etc.

Excellent fringe benefit program.

Qualified candidates send one resume for each position in which there is an interest indicating salary requirements to: CW Box 5027, 797 Washington St., Newton, Mass. 02160

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(Programmer)

PROGRAMMER/ ANALYST

General Dynamics Data Systems Services has several challenging career opportunities for Engineering Computer Software professionals. Both junior and senior level positions are available in the areas listed below. Individual assignment will depend on educational level (BS minimum) and experience.

ANALYTIC PROGRAMMING

Degree should be in Electronic Engineering, Computer Scienc, or Mathematics with experience in one or more of the following areas:

- Computer-Aided Design
- Simulation Modeling Techniques
- Computer Systems Architectures
- Computer Networks
- Graphics and Peripherals
- Numerical Analysis and Applied Statistics

COMPUTER SYSTEMS SERVICES

Degree may be in any related discipline. Positions require the analysis and software development for:

- Command and Control
- Weapon Direction
- Weapon Guidance
- Data Acquisition
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Candidates should submit their resumes to:

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Faculty Position

Arkansas Tech University

The Computer and Management Science Department at Arkansas Tech has a nine-month permanent teaching position for an Assistant Professor starting August 22, 1977. Duties would include teaching Introductory and Intermediate level Computer Science courses and all levels of Quantitative Management Science courses. Minimum Qualifications: Masters degree with appropriate experience, coursework, and abilities. PhD is desired. Closing date is May 15, 1977. For information contact:

Don B. Mitchell, Head
Computer and Management
Science Department
Arkansas Tech University
Russellville, Ark. 72801

Arkansas Tech is an Affirmative Action/Equal Opportunity Employer

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DP PROJECT LEADER

Large Southeastern corporation seeks experienced DP professional to lead engineering programming group involved in electric utility transmission and generating planning and power system stability. Must have electrical engineering degree plus five years experience in scientific programming with background in IBM 370 environment. Position requires both administrative and leadership skills. We offer Atlanta location, excellent benefits and competitive salary. For prompt consideration forward resume with current salary to:

W.H. Oliver

Southern Company Services, Inc.

P.O. Box 720071
Atlanta, Georgia 30346
Equal Opportunity Employer

PROGRAMMER
PROGRAMMER/ANALYST
$16,932 to $20,964
Annually

Southern California Rapid Transit District has immediate need for experienced EDP personnel. Requires one-year Programmer or Systems Analyst experience and a B.A./B.S. degree (additional qualifying experience may be substituted for up to two (2) years of the required education on a year-for-year basis). Must have working knowledge of ANSI-COBOL or FORTRAN; experience with Univac 1100 series equipment is preferred.

Send resume to:
PROGRAMMER/ANALYST
Personnel Department
Southern California
Rapid Transit District
425 South Main Street
Los Angeles, Calif. 90013
Equal Opportunity Employer M/F

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field engineering

A Very Good Year for Us. A Better One for You?

Most computer professionals are aware that today's most advanced large-system technology was developed by a company that, not too long ago, was virtually unknown.

Now the phenomenon is widely known. Amdahl's 470V/6 performs as promised. And the company performs as promised: our hardware and software support exceeds the established standards.

Not well known, however, is that this major supplier of large systems is still, in terms of staff size, relatively small. At Amdahl, you're not lost in a sea of people: we began 1976 with less than 400 people and ended it with less than 800. There's still room on the ground floor.

We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in California on full salary with housing, transportation, and other expenses provided.

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You will have a minimum of 5 years' experience in maintaining large-scale systems with in-depth training on compatible CPUs. You will have company support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. Openings in several major cities and at Amdahl headquarters in California. Please indicate 560-E on your response.

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You will carry the Amdahl philosophy of customer service as well as your expertise into the field, utilizing your initiative and talents to aid the customer in restoring computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Please indicate 567-3E on your response and direct it to the Amdahl regional office nearest you as shown below.

FIELD ENGINEERS: TEMPORARY DUTY IN EUROPE

Immediate openings for field engineers to work at Amdahl installations in Europe as an initial assignment. You will join the permanent field engineering staff, with your first assignment being approximately one year in Europe. Same qualifications as stated elsewhere in this ad for field engineers. Please indicate 905-E on your response.

Amdahl Corporation
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Sunnyvale, California 94086

Amdahl Corporation
680 Fifth Avenue
New York, New York 10019

Amdahl Corporation
2021 Spring Road
Oak Brook, Illinois 60521

Amdahl Corporation
22150 Greenfield Road
Oak Park, Michigan 48237

Amdahl Corporation
5454 Wisconsin Avenue, Suite 1535
Chevy Chase, Maryland 20015

amdahl

DATA TELECOMMUNICATIONS ANALYST

Prominent San Francisco-based wholesale distributor has immediate opportunity for an experienced data communications specialist to assume responsibility for all aspects of corporate data communications planning activities.

Successful candidate will plan, design, and introduce implementation of nationwide and international data communications facilities. Ability to write analyses, select teleprocessing equipment such as modems, multiplexers, terminals, electromagnetic carriers, and troubleshooting/measurement facilities is required. Knowledge and use of common carrier and computer interface troubleshooting equipment is required. Working familiarity with OS/RJE, BTAM, CICS software is required.

Position requires BS/EE plus five years engineering design and analysis of data communications systems.

Please send resume including salary history to CW Box 5024, 797 Washington St., Newton, MA. 02160. *An Equal Opportunity Employer M/F.*

DIRECTOR OF COMPUTING SERVICES

Plan and manage the development and operation of applications systems to support teaching, research and business operations; and direct computer operations. Master's degree or an equivalent combination of education and experience necessary. Faculty appointment possible. Salary competitive. Position filled after July 1, 1977. Address resumes by June 10 to: Chairman, Director of Computing Services Search Committee, Office of Academic Affairs, The University of Michigan-Dearborn, 4901 Evergreen, Dearborn, Michigan 48128. An Equal Opportunity/Affirmative Action Title IX Employer.

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Degree plus expertise on mini-computer systems. This position will have major accounts and/or territory responsibilities for complex installation and maintenance requirements.

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Technical school graduate to service a range of computer equipment and peripherals.

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Associates Degree plus expertise on mini-computer to include installation and maintenance on mini-systems.

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740 N. CHURCH ROAD
ELMHURST, ILL. 60126
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Infodata Systems, prominent in data base management and information retrieval systems, is looking for several Senior Software Development Specialists to participate in state-of-the-art software projects intended to create significant innovation in the marketplace. Large scale software systems design and implementation in an IBM, OS, VS, or MVS environment is required. Comprehensive assembler language or PL/1 experience is also required. Familiarity with any of the following is desirable: OS/VS internals, data base structures, VSAM, or artificial language design. For the right persons, compensation will be exceptional. These positions are at our suburban Washington, D.C. office.

Send resume with salary history, or call:

Mr. Thomas O'Brian
Infodata Systems, Inc.
5205 Leesburg Pike
Falls Church, VA 22041
(703) 578-3430
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Full-time faculty position, starting Sept., 1977. Teaching graduate and undergraduate in Systems Programming, Systems Analysis, Data Structures, CAI, or combination. Preference given Ph.D. in Computer Science or related area with industrial experience. Rank, Salary dependent on qualifications. Send inquiries, vita (include three references) by May 25, 1977, to Dr. Oonald Handerson, Computer Science Department, Mankato State University, Mankato, MN 56001.

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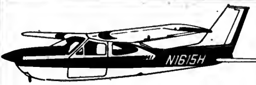

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The individual we are seeking will have the opportunity to grow with our expanding EDP department.

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To find out more about this salaried position offering attractive benefits and competitive salary, send your resume and salary requirements to:

Employment Manager
Pawnee Division
Cessna Aircraft Company
P.O. Box 1521, Dept. 70
Wichita, Kansas 67201

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DATA PROCESSING INSTRUCTOR

B.S. or B.B.A. in Business Administration or Computer Science. Three years experience in data processing-related business positions. Evidence of thorough knowledge of COBOL, BAL, and systems theory. Closing date for formal Harper College application is June 13, 1977. Please direct resumes to: Mr. James J. Smith, Personnel Specialist, William Rainey Harper College, Algonquin and Roselle Roads, Palatine, Ill. 60067. An Affirmative Action/Equal Opportunity Employer.

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SENIOR TO $1,708/MO.
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SENIOR: Equal to college grad. and 4 yrs. systems analysis, design, and programming, including 2 yrs. in ANS COBOL, JCL, OS/VS (Rel. 21 or higher).

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Personnel
202 C Street
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Programmer II

DEC 10 Programmer

Duties include development and implementation of programs for system access control, usage accounting and monitoring; installation and maintenance of data base management software; implementation and maintenance of data entry software on PDP-11 computers.

Qualifications required: h.s. degree and at least one year post h.s. education including relevant courses; at least three years programming experiences on a DEC 10 system, demonstrated ability to program in MACRO-10 and thorough knowledge of TOPS-10 file systems.

Forward resume no later than May 23, 1977 to Carl Hamrin, Kingsbury Hall, University of N.H. Durham, N.H. 03824. *An affirmative action/equal opp employer.*

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engineers

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Six years ago, we set out to design and build a new generation of large computers. Today, that goal is a reality. At that time, the company was virtually unknown. Today, we are one of the most talked about companies in the computer industry. A year ago, we were less than 400 people. Today, we're about double that.

But some things haven't changed. Like the exciting and challenging environment. Like our excellent compensation and benefits package. Like our friendliness, regard for human feelings, and the sense of involvement that has characterized the company since we began. And we're still growing. Which is why we need help; from the same kind of competent, enthusiastic individuals who helped make us the exceptional company that we are today. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale CA 94086. We are, of course, an equal opportunity employer.

PERFORMANCE WORKLOAD SPECIALIST

You will be involved in computer performance evaluation and measurement. You are interested in the problem of categorizing, classifying, and creating workloads which contribute to meaningful measures of performance. Your background includes involvement in computer performance evaluation or measurement. Please indicate 437-E on your response.

SOFTWARE ENGINEERING SPECIALIST

You are a senior person who will be involved in the design and implementation of tools which provide software change control or configuration management. You will be working in an interactive engineering software development environment, and you are experienced in the software development process. Please indicate 437-E on your response.

amdahl

EDP
Criminal Justice Environment

SEARCH Group, Inc., a national non-profit organization dedicated to the application of technology to the justice system is seeking two professionals experienced in EDP and familiar with the criminal justice environment. Excellent salary and fringe package. Wide latitude for independent work and innovation. Send resume to: Mr. Bert DiPaola, Manager, Technology Transfer, SEARCH Group, Inc., 1620 35th Avenue, Suite 200, Sacramento, Calif. 95822.

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Advanced Technological Services
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Salary commensurate with experience. Please rush your resume in confidence to:

Home Federal Savings
& Loan Association
Personnel Office
P.O. Box 2871
Tucson, AX 85702
Equal Opportunity Employer M/F

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PROGRAMMERS

Minimum 2-3 years experience to include real time assembler language on mini-computers, micro-processors and peripherals. PDP experience a big Plus. Program design, flow charting, documentation and testing will be the key to this position.

SYSTEMS ANALYSTS

Minimum 2-3 years experience to include real time assembler language. A good command of systems analysis and user interface . . . the ability to plan, schedule, coordinate and lead development of systems on mini-computers, micro-processors and peripherals. PDP a plus.

We offer an excellent starting salary and company paid benefits. For more information contact us now. Your inquiry will be held in strict confidence. Please submit your resume which must include salary history to:

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Local Interviews

CW Box 4982
797 Washington Street
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As one of the midwest's leading multi-divisional management consulting and systems integration organizations, our steady growth requires top professionals in the following areas:

***IBM 370: Systems Software, Multi-Programming, OS Internals, Performance Monitoring, CICS, COBOL, PL/1**
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PROGRAMMERS

Financial and/or Merchandise Applications. At least 3 years experience with Honeywell 66 and Data Base is required.

We offer excellent starting salaries and a very comprehensive and complete benefits package. Please send resume, indicating salary history and experience in complete confidence to: Mr. Carl Holtoman, DIRECTOR OF DATA PROCESSING'

Service Merchandise Co., Inc.
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MIS

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Three years systems and programming experience in manufacturing environment. Must be knowledgeable in design and implementation of major systems including cost justification, systems studies, scheduling and project reporting. Bachelor's degree or equivalent experience required.

• SR. PROGRAMMER ANALYST

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Diamond Power is a major subsidiary of Babcock & Wilcox, a pacesetter in the energy industry and offers compensation commensurate with background and excellent benefits. Please send resume identifying job of interest to Mrs. Jean Muck, Diamond Power, The Babcock & Wilcox Company, P.O.B. 415, Lancaster, Ohio 43130, or CALL Mrs. Muck at:

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SYSTEMS PROGRAMMERS

Two staff positions exist in an expanding technical support group responsible for two SVS/HASP 370/158 systems.

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• PROGRAMMER/ANALYST (5) Sys III - RPG II	$14-18K
• TECH SUPPORT SPECIALIST 370/DOS- BAL, CICS	$17-19K

Please forward resume, or call (312) 454-8490 to investigate these or other positions.

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214 N. Michigan Ave., Rm. 600
Chicago, IL 60601 (312) 454-8490

2000 West Loop South
Houston, Tx 77027 (713) 965-5666

SYSTEMS PROGRAMMER

Our client, a NYSE listed manufacturer, seeks an individual experienced in OS software, BAL, and COBOL. Exposure to TSO or IMS a plus. $18,000 range, FEE PAID.

ROBERT HALF
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Memphis, TN 38112
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As leading suppliers of advanced microprocessor based data communications hardware, our expanding business presents growth opportunities for qualified professionals.

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ENGINEERING

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  Real Time/Communications
- PROGRAMMERS
  Real Time
- MECHANICAL ENGINEER
  Electrical Packaging Layout
- DIAGNOSTIC PROGRAMMERS
  Microsystems

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Western Union Information Systems
A Western Union Teleprocessing Division

An equal opportunity, affirmative action employer, M/F

PACIFIC NORTHWEST

Excellent Data Processing opportunities exist in the Pacific Northwest for the experienced professional who desires to live and work in one of Americas most beautiful localities. Current needs include programmers and analysts with skills in Mortgage and Loan, Retail, Manufacturing, Banking, Insurance and other general business environments.

We are the Northwest's oldest and largest executive search firm with offices in Seattle, Portland, and Anchorage.

We value your confidence and will respond to all resumes.

Jerry Costello, Mgr.
CompuSearch
Div. of Mgmt. Recruiters
2200 6th Avenue
Seattle, WA 98121
Employer Paid Fees

programmer analyst

Challenging opportunity for career minded programmer/analyst to perform all programming functions, including program design, systems maintenance, analysis of user requests, and generally keep abreast of state-of-the-art programming techniques. Applicants should have a degree, OS,-JCL, IBM hardware plus 2 years Applications programming experience, such as accounting, personnel, distribution or advertising, with a sound knowledge of COBOL and BAL. Familiarity with FORTRAN helpful.

Qualified persons should send detailed resume including salary history and requirements to: Stephen Lewis, Bristol-Myers Company, 345 Park Avenue, New York, N.Y. 10022. An equal opportunity employer m/f.

BRISTOL-MYERS

SYSTEMS FEE PAID To $30M+

IMS DL-1

SOFTWARE MANAGEMENT

These are the keys to an exciting career opportunity. Our client corp is the recognized leader in their field.

Large scale 370 on line with CICS is now running. New and significant Data Base expansion will be your initial task. You will have high visibility within the corp and as a manager be responsible for technical and administrative functions. Excellent benefits package and local – not NYC – location. Call for information and immediate interview. Company paid relocation.

(212) 682-8600
F-O-R-T-U-N-E
DATA
agency 505 5 Av NYC 10017

DENVER

AND THE WEST

S & P Professionals!

Urgent client staffing needs throughout rapidly growing West. Positions require business applications and combinations of COBOL, BAL/COBOL, IBM-DOS (VS), OS-VS, CICS, (Any IBM related TP), DL-1-IMS. Locations are Denver, Cheyenne, SLC, Great Falls, Albuquerque, Dallas-Ft. Worth, Portland. Openings for P/As, Analysts, Designers, Tech Support and software, Project Leaders, and 1 Data Base Designer.

Applications in Accounting, Banking, S&L, Blue Cross/Blue Shield (especially Membership, Claims and Gov't Systems).

Salaries $15-25k. All fees, interview, relocation co. paid. Send detailed resume with current salary to Ken Thompson.

THOMPSON-DENVER ASSOC.
Suite 301 8073 W. 44th Ave.
Wheat Ridge, Colo. 80033

Programmers Systems Analysts

Compile a better career!

We are a world leader in the manufacture of microcomputer systems and you will be immediately caught up in challenging work at the outer edge of the state-of-the-art. This includes exposure to microprocessor technology and the relatively rare opportunity to develop skills in this area.

We are located near Cornell University in one of the loveliest cities in the beautiful Finger Lakes area where living is an exciting experience equally rich in educational and recreational opportunities. We will assist in relocation, if hired.

We are seeking applications from people with the following experience:

- Communications: Networks and SDLC, bisynch, asynch disciplines
- Operating Systems Design and Implementation
- Applications: Data Entry/Data Inquiry Systems, Distributed Processing

BS Computer Science and 1-7 years experience required.

We offer an outstanding compensation and benefit package – let us hear from you. Send resume and salary requirements in confidence to:

NCR

Mr. M.A. Friedenberg
Terminal Systems Division
NCR Corporation
950 Danby Road
Ithaca, N.Y. 14850

An Equal Opportunity Employer

COMPUTER SOFTWARE SPECIALIST

Aquidneck Data Corporation, an innovative new software consulting firm located in Middletown, Rhode Island, is hiring computer software specialists to fulfill commitments in Navy on-line systems for shipboard applications. Openings exist for qualified professionals in system design, programming, documentation, and management.

• THE COMPANY

The company is founded on a philosophy which includes employee ownership and control; bonuses for excellent achievement; profit sharing; Management by Objectives; and an open, professional atmosphere.

• THE AREA

Middletown, Rhode Island is located next to historic Newport, and is convenient to both the Providence and Boston metropolitan areas. It is pleasantly situated on the ocean and in peaceful rural surroundings. It offers a diversification of both winter and summer recreational activities.

• THE WORK

Aquidneck Data Corporation's business is based on identifying with the customer and solving his problems. For this reason, employees need excellent communication skills and an ability to function effectively in a team. There are opportunities for leadership and management, as well as technical achievement in the following areas:

SYSTEMS ANALYSIS

Systems Analysts at both the junior and senior level are needed for software development projects. Required technical skills include computer program design, coding, checkout, documentation, and system integration. Experience is desired in AN/UYK-7 programming particularly in on-line combat systems applications. Experience with CSM-2 and the AN/UYK-20 is also useful.

SYSTEM TEST ENGINEERS

Openings exist at senior level positions for consulting on the TRIDENT CCS integration/certification testing efforts. Requires knowledge of TRIDENT CCS and preferably experience in combat system testing.

ADVANCED SYSTEMS ANALYSIS

Positions are open for complex shipboard operational system design for mid-1980's submarines. Requires in-depth knowledge of state-of-the-art software architecture and development techniques. Prefer experience with on-line combat systems.

TECHNICAL WRITERS -NAVY OFFICERS

Senior level positions are open for candidates with technical writing experience in computer software documentation. Assembler language programming experience, knowledge of Navy combat systems, or systems analysis background is desired. Individuals with backgrounds as Navy commanding officers on FBM submarines are also being hired to develop documentation.

SOFTWARE CONFIGURATION MANAGEMENT

Individuals with experience in software configuration management and control of large scale software products are being hired. Recent experience with Navy combat systems and project management is desired.

If you are looking for an opportunity for personal growth, send a copy of your resume to:

Ms. Jan Lauver
Aquidneck Data Corp.
Box 99 • Middletown, Rhode Island 02840

an equal opportunity employer M/F

WESTERN MICHIGAN

If the "technician" stereotype doesn't fit your level of personal development, two major firms would like to see you apply your real potential. Both companies utilize IBM 370, COBOL and ALC, with facilities such as CICS and DB/DC. College degree and experience in these areas desirable, not a must. Needed:

MANAGER
SYSTEMS & PROGRAMMING

Able to participate in innovative planning and decision making, track record shows results. Salary flexible in mid $20's.

PROJECT LEADER

Some supervisory skills evident, able to assume increasingly more of the management function in programming and systems. Ideal $16-18K.

Contact recruiter: Joe Grabinski, Career Consultants, 666 Frey Bldg., Grand Rapids, MI. 49503. (616) 459-6156 or evenings (616) 837-6927. Employers pay all fees (of course).

LIFE INSURANCE

Listed below are a few of the many excellent positions in life development or consulting fields awaiting the right candidates. All inquiries will be handled personally by Jack Edwards, who has spent 18 yrs. in the life insurance field himself.

SOUTHWEST:

COBOL or ALC experience in LIFE insurance environment required. Positions in development, project management or marketing. Actuarial a plus.

SOUTHEAST:

COBOL or ALC experience in LIFE insurance, investments, actuarial or pensions. Development or consulting.

MIDWEST/NORTHEAST

COBOL or ALC experience in LIFE insurance environment. Large development project positions as SR. Systems Engineers.

CANADA:

COBOL LIFE insurance experience to participate in on-line development project.

Salaries vary by location and experience ranging from $15,000-$30,000.

Randolph (Jack) Edwards FLMI
DATA PROCESSING CAREERS, INC.
7715 Chevy Chase Dr. Suite 125
Austin, Texas 78752
(512) 452-0871
Nationwide Personnel Consultant

SYSTEMS

Expansion of our Point-of-Sale Systems Division

National Semiconductor has established itself as a leader in the rapidly growing electronic point-of-sale systems business. We are developing micro computer terminals tied to in-store multi-processor minicomputers. These in turn are connected via telecommunication links to IBM 370 host computers. Our continuing growth in this market has created many opportunities for programmers and system support representatives. If you are a self-starter and are results-oriented, we want to hear from you.

Software Development Programmers

We have positions immediately available from the entry level through management for systems development professionals. These positions are based in our corporate offices on the San Francisco peninsula. Experience should be in one or more of the following:

- **Communications systems - IBM 370 and minicomputer.**
- **Minicomputer operating systems, languages and development tools.**
- **Systems applications - POS, energy management, labor scheduling, etc.**
- **POS terminal applications programming**
- **Test and diagnostics for factory, field service.**
- **Product test, documentation, distribution and support.**

Systems Support Representatives

Will aid in the installation of key entry and scanning Datachecker supermarket systems. As systems support representative you will be responsible for the following:

- **Coordination of key entry or scanning store installations.**
- **Installation and support of communication software.**
- **Customer training on Datachecker functions and operations.**
- **Customer training and consultation on in-store application language.**
- **Installation and support of in-store application packages.**

These positions are available nationally. When responding please list your area of preference

For confidential consideration, please forward your detailed resume or summary sheet to Mike Hawkins, National Semiconductor Corporation, 2900 Semiconductor Drive, Santa Clara, California 95051, or call TOLL FREE (800) 638-1915. We are an equal opportunity affirmative action employer male and female.

National Semiconductor
SYSTEMS DIVISION

ELECTRONIC

PRODUCT SPECIALIST
MINI COMPUTERS

WORD PROCESSING

Manager of Headquarters Technical Dept., Customer Engineering Division, has unusual opening for Specialist at its Midtown, NY City office. Applicant should have a background in Digital Electronics Microprocessors, and work experience in either with above listed products, or similar systems products. Attractive starting salary plus benefits. Drop by, Call or Send Resumes to:

MR. BOB LUNDRY
OLIVETTI
Corp. of America
500 Park Aveenue
New York, N.Y. 10022
(212) 371-5500 Ext 264 or 206
Equal Opp. Emp. M/F

MANUFACTURING SYSTEMS ANALYST

Continued Corporate growth has dictated the following position for a Creative Systems Analyst who can adapt an existing system package as a basis for a Manufacturing Information System.

To Qualify you must be able to design input and output specifications including management reports, and schedule, implement and maintain M.I.S. manual and computer procedures. No direct programming required. We require 1-2 years experience with manufacutring systems and a college degree.

We offer pleasant working conditions and company-paid benefits at our Northern New Jersey Location. Please submit a detailed resume including current salary to:

CW Box 4990
797 Washington St.
Newton, Mass. 02160
Equal Opportunity Employer M/F

IF YOU'RE READY . . . . . .

If you have made your decision to change jobs, our job is helping you. Computer Source specializes solely in the placement of computer professionals in all areas . . . Management, systems, programming and operations. With 165 affiliate offices in 126 major U.S. cities we have the resources to search for the right opportunity for you . . . whether a specific locale or nationally.

The following are only a few of the many opportunities we currently have available. Whatever your goal is, contact us now . . . and let us do the search work for you. All positions are fee paid.

DATA BASE ADMINISTRATOR

Requires significant experience in data base management (IMS). Must be a sound manager with the technical know-how to manage the implementation of IMS in a 370/168 environment. Texas location. Salary $35-45,000.

SYSTEMS PROGRAMMERS

Requires programming experience in COBOL and/or BAL in 370 environment under CICS or IMS. Multiple openings/locations. Salary $17-25,000.

MINI-COMPUTER PROGRAMMERS

Experience in real time mini applications (primarily process control) using appropriate assembly level language on DEC, Data General or Foxboro hardware. Multiple openings/locations. Salary $14-24,000.

APPLICATIONS PROGRAMMERS

Experience in COBOL or PL1 in large scale environment (preferably using CICS, IMS or TOTAL). Multiple openings /locations. Salary $14-24,000.

SYSTEMS ANALYSTS

Experience in PICS, BDMP, MRP and/or standard cost. Should be familiar with COBOL or PL1. Multiple openings/locations. Salary $16-25,000.

Please send complete resume with current salary and geographic preference in complete confidence to: Ky McCarthy.

SPECIALISTS IN COMPUTER PERSONNEL PLACEMENT
COMPUTER SOURCE
A Division of Weterrings & Agnew, Inc.
425 Midtown Tower, Rochester, N Y. 14604 • 716-454-4790
(agency)

SYSTEMS PROGRAMMER

Pittsburgh National Bank requires an experienced Systems Programmer to participate in the installation/maintenance of IBM 370/158 MP Operating Systems Software.

Related responsibilities will include system generation planning and execution, system performance measurement and tuning, system modification, and installation of software packages.

Experience with MVS or VS2 and BAL required. If you have a background in Software for Technical Support, Please submit a resume including salary history to: Sharon W. Council, Personnel Division.

PITTSBURGH NATIONAL BANK
5th & Wood Street
Pittsburgh, PA 15222
All replies will be kept confidential.
An Equal Opportunity Employer M/F

SUN BELT OPPORTUNITIES

MRP

Systems Analyst . . . . to 25K
Detailed knlg. MFG control systems, BOMP, prod. control, standard cost, shop floor control.

Applications Prog . . . . . . to 18K
Any BOMP, DBOMP, MRP. 2+ yrs. ANSI COBOL. Chance to learn IDMS.

CICS

Prog/Analyst(s) . . . . to 20K
ANSI COBOL or ALC DOS/VS or OS/VS. 2 yrs. exp.

Network Planning . . . . . to 20K+
Must have programmed CICS applications in COBOL or ALC.

DS

Systs Programmer(s) . . . . to 24K
Must knlg. OS/VSI, Sysgen, CICS, ALC, Min 2 yrs. exp. Any BTAM, VTAM, NCP, TOTAL or IMS is a plus.

EDP SALES

Marketing Rep(s) . . . . to 19K
Time sharing sales to Fortune 500 executives. Client desires MBA with undergrad. in Acct. 6 months training prog.

HONEYWELL 6000

Prog/Analyst(s) . . . . to 18K
2+ yrs . exp. COBOL & GECOS. MFG background preferred.

ROBERT HALF
PERSONNEL AGENCIES
Friendship Center Office Park
Suite 308
Greensboro, N.C. 27408
(818) 855-5892

IMS SYSTEMS PROGRAMMER

We are a major chemical/pharmaceutical company located in suburban New Jersey. We have an immediate opening on our Systems Technical Planning and Support Staff for a Systems Programmer.

Applicants should have at least two years experience with IMS DB/DC internals and applications support.

We offer a professional environment and an excellent salary/benefits package. Please send resume, including salary requirements, to Mr. D. O'Leary, Personnel Department. Strict confidence maintained.

AMERCIAN HOECHST CORPORATION
Rt. 202-206N, Somerville, N.J. 08876
An Equal Opportunity Employer, F/M

SYSTEMS ANALYST

Owens-Corning Fiberglas, a leader in the Fiberglas Industry, is seeking a systems analyst for the corporate staff of one of its larger operating divisions. The successful applicant for this position will possess the following qualifications:

- Bachelor's degree in Business or Computer Science
- At least two years experience in Systems Design or Programming
- At least two years experience in either on-line systems design (specifically CICS) or at least two years experience in IDMS data base.

Primary responsibility in this position will be in the planning and control of activities related to developing new systems as well as modification to existing systems.

This position offers an outstanding growth opportunity to the right person, as well as an excellent salary and benefit package.

Qualified applicants should send a current resume with complete salary information in confidence to Mr. G.T. Mills, OWENS-CORNING FIBERGLAS, Fiberglas Tower, Toledo, Ohio 43659. No Phone Calls, Please. An Equal Opportunity Employer M/F.

Discover the Future of OWENS-CORNING FIBERGLAS

PROGRAMMER

San Diego based manufacturer has immediate need for Programmer. 3-5 years COBOL experience with hands-on programming using data base management on ISAM file techniques in both on-line and batch applications. Teleprocessing systems exposure for mini computer. Should like nuts and bolts research and problem solving opportunities and enjoy tuning hardware and software elements. Formal college education/degree desirable. Submit resume and salary history, in confidence, to:

CW Box 5025
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

360/370 CUSTOMER ENGINEERING INSTRUCTOR

CIG Computer Products is rapidly becoming a leader in training 360/370 maintenance to third party and peripheral maintenance companies.

Currently, there is an opening for a Field Engineer/Instructor to develop courses and teach maintenance of the IBM product line of 360/370 CPU's, Control Units, and I/O Devices.

CIG is located in rural North Royalton, Ohio (outside Cleveland). Salary — 18K to 21K. Relocation paid for by CIG. Contact Joe Reichard, Manager of Education, by phone (216) 237-8363, or send a resume to the following address:

CIG COMPUTER PRODUCTS, INC.

Attn: Joe Reichard
Manager of Eeucation
13408 York Road
North Royalton, Ohio 44133

SOFTWARE DEVELOPMENT PROGRAMMERS

NCR's Terminal Systems Division in Millsboro, Deleware has unparalleled career opportunities for individuals interested in advancing state-of-the-art in POS terminals.

SYSTEMS PROGRAMMER/ ENGINEER

- Experience with DEC PDP 11/35 or higher level computers required.
- Requires a background in minicomputer or microprocessor systems and/or associated application programming.

SYSTEMS I/O-F/W PROGRAMMER

- Requires experience in general purpose applications minicomputer programming of peripheral devices, at the assembler level.
- Responsibilities will include the definition and supervision of coding of applications oriented F/W to interface POS terminal peripherals to the base ECR.

COMMUNICATIONS F/W PROGRAMMER

- Requires experience in data communications minicomputer programming at the assembler level.
- Experience with RJE-type communications and synchronous protocol preferred. Knowledge of SDLC fundamentals a plus.

DIAGNOSTIC ENGINEER/PROGRAMMER

- Requires an engineer or hardware-minded programmer with minicomputer programming experience and a flair for the challenge of diagnostic test software.

All positions require a BS in EE, CS or related discipline.

In addition to an unparalleled career opportunity within NCR, our Millsboro location offers comfortable living in a scenic and uncongested coastal area. The finest marine recreational areas, wildlife preserves, and beaches are within minutes of our Millsboro facility.

NCR

Mr. Ron Tull, Dept. CW-59
Terminal Systems Division-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

An Equal Opportunity Employer

DATA PROCESSING IN FLORIDA & THE SOUTHEAST

If you are a programmer with experience in the following areas we need you for openings in Florida and the Southeast.

[redacted] Filled	[redacted]
Sys Programmers, IMS, DB & Operations	to 25K
Real Time/Minicomputers	to 23K
Banking, any applic.	to 23K
Engineers/Scientific programmers	to 28K
T.P./Message switching	to 23K
NCR Financial & On-line COBOL & NEAT-3	to 20K
IBM COBOL, Light Experience, Degree preferred	to 18K

For information about these and other positions, call or send resume to:

LOUISE RESNICK
DATA SCIENCES
PERSONNEL, INC.
15490 N.W. 7th Avenue
MIAMI, FLA. 33189
(305) 883-7281

COMPUTER SCIENCE FACULTY POSITIONS

An Assistant Professor position will be filled by a person who holds, or is working toward, a doctorate; is qualified to teach programming courses (COBOL, FORTRAN, Assembly); and has expertise in business data processing, systems software, or hardware.

An Instructor position may be filled by a person who holds at least a master's degree and is qualified to teach programming courses.

Either or both of these positions may be filled on a temporary, academic year basis. Salaries are competitive. Starting date is September, 1977. Applicants must send, by May 31, a resume with names and addresses of three references to:

Dr. Jarrell C. Grout, Head
Department of Computer Science
Stephen F. Austin State University
P.O. Box 3187
Nacogdoches, Texas 75962
Equal Opportunity,
Affirmative Action Employer

DATA BASE MANAGER

Responsibilities will include operational control of the University's data base and management information systems, develop standards for data elements and structures, and assure the quality control of application programs. The data base is presently under development and the first module is expected to become operational in July. Requires a Master's Degree in computer science, or a computer-related discipline, at least four years of programming/analysis experience including the design and implementation of data bases, and a strong ability to communicate with administrative personnel. Knowledge of and experience with DEC system 1080 and DBMS-10, MCS-10 will be highly desirable. Send resume to Mrs. Betty Miles, University Personnel Services, University of Louisville, Louisville, Ky. 40208.
An Equal Opportunity Employer

EDP SPECIALISTS

Nationwide

• Mtg DIRECTOR Major NYC Corp.	To $50M
• CONSULTING MGR Midwest, large corp.	To $45M
• MGR SYS & PRGRM New England mfg co	To 30M+
• MGR SYS DEVEL Major NY Corp	To $30M

Fees assumed by client co's

LESLIE, KAVANAGH
505 5th Av, NY, NY 10017
(212) 661-0670 (agency)
Corporate Inquiries Welcome

SENIOR SYSTEMS PROGRAMMER

DCC, a subsidiary of Data General is a leading factor in the mini-computer industry with over 12,000 computers installed. We are expanding our efforts in support of the new SYNERGIST Business System and have an opening for a computer professional.

You must be experienced with ASSEMBLER language on our DCC-116 or Data General's NOVA line. The ideal candidate will be familiar with operating systems and the interfacing of peripherals. We offer a competitive starting salary and a full range of company benefits.

For prompt consideration,
send resume in confidence to:
R. WOODWARD, Manager, Systems

DIGITAL COMPUTER
CONTROLS INC
a subsidiary of Data General
12 Industrial Road, Fairfield, N.J. 07006
An Equal Opportunity Employer M/F

THE RESUME SYNDROME

19 of 20 resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, ask for our free booklet "How to Write A Resume". In fact, send your resume and we'll critique it. All replies held in strictest confidence. 100% company retained consultants.

The National Personnel System
Dunhill
OF DEARBORN, INC.
Parklane Towers West, Suite 519
Dearborn, MICH 48126
(313) 336-7990

IMS PROFESSIONALS ONLY

If you are a programmer programmer/analyst, systems analyst, or EDP professional and would like the most individualized job search offered in the data processing field today on a local or national level, forward your resume, with present salary and geographical preference, in strict confidence, to:

E.D.P. SEARCH, Inc.
P.O. Box 331
Hartford, Conn. 06101

GECOS

If you are interested in relocating to the beautiful Pacific Northwest, we currently have an excellent position for an EDP professional with GECOS internals experience.

Data Base Admin . . . to 30K

Contact Jim Morris or Bill Parfitt. Houser, Martin, Morris and Associates, 1621 114th S.E., Suite 219, Bellevue, WA 98004 (206) 455-9600.

SYSTEMS ANALYST/SYSTEMS ANALYST PROGRAMMERS

General Computer Services, Inc., a leader in Software development, is seeking several highly qualified individuals.

The candidates for Systems Analyst position must have in-depth knowledge of banking applications; payroll experience required.

The candidate for Systems Analyst Programmer must have a minimum of two years experience in COBOL; 360/370 experience required; financial experience required; payroll and OS experience desirable.

The positions to be filled are at the Company Headquarters in Huntsville, Alabama.

Send Resume To:

Personnel Department
General Computer Services, Inc.
P.O. Box 5148
Huntsville, Alabama 35805

SYSTEMS PROFESSIONALS FOR OVERSEAS ASSIGNMENTS

Our international staff currently has several openings for qualified systems professionals with significant experience in the heavy manufacturing/metals industries.

- EDP management expertise to assist in the expansion of a present EDP facility
- Project management and analytical capability to lead the development of large, automated production/inventory control systems in the steel industry
- Technical systems software and operations capability with solid experience in developing and implementing large data capturing systems

Ideal candidates should have a minimum of seven years systems experience. Fluency in Spanish is desirable, but not essential. An outstanding salary and foreign benefits package accompany these challenging career opportunities. Please send resume to:
Box 1618, Suite 1600, 711 Fifth Avenue, New York, New York 10022. We are an equal opportunity employer, m/f.

Data Processing Director

Monroe County Intermediate School District is seeking a director of data processing who will be responsible for planning and management of a computer facility which has a staff of seven, a budget in excess of $220,000 and a Burroughs B1726 mainframe.

Candidate must have at least five years experience and demonstrate management ability and technical competence in computing. Salary range is $21,000 to $25,000 depending upon qualifications. Position is to be filled as soon as possible, preferably by July 1, 1977. Submit letter of application and resume to Dennis McCulloch, Monroe County Intermediate School District, 1101 South Raisinville Road, Monroe, Mich. 48161. (313) 242-5454.

SOFTWARE SPECIALIST

PDP-11

Our client, a Fortune 500 Co., seeks a software pro to take responsibility for software development, system specifications, and implementation procedures. Exp. preferred in COS 300/350, RT 11, and fin'l. systems. Salary to $30M. Please submit resume in confidence.

Consultant - EDP Division
R.M. Ferren Associates
505 Fifth Ave., NYC 10017
Telephone: (212) 986-5510
Executive Search Consultants

SYSTEMS ANALYSIS

Newport, Rhode Island

Due to recent growth, openings at all levels exist for:

* SYSTEMS ANALYSTS

Openings exist for experienced analysts and programmers. Work includes design of Fire Control, Command and Control Systems for attack submarines. Realtime assembly language programming experience is required. Exposure to CS-1 or CMS-2 is desired.

* DOCUMENTATION

Duties will include preparation of Software ocumentation. Previous systems analysis experience or technical writing in a programming environment is desired.

Systems Consultants, Inc. is a nationally known engineering firm headquartered in Washington, DC. All positions are located in Newport, Rhode Island, a unique small community offering vast recreational and cultural opportunities. We offer interesting assignments, attractive starting salary, fringe benefits and paid relocation.

If interested, please send resume to:
Newport Division
SYSTEMS CONSULTANTS INC.
P.O. Box 330
Middletown, RI 02840

SCI
SYSTEMS CONSULTANTS INC

an equal opportunity employer

Data Processing

Computer Systems Architect

Microform Data Systems is interested in entering into either an employment or a consulting agreement with an individual who will perform conceptual systems design of new products and provide presale marketing support. You will be responsible for the following:

- PDP-11 Hardware configuration design for statewise host-satellite computer systems supporting 200-800 terminals.
- PDP-11 Networking software design for application of a specific system (not general purpose system).

You must have demonstrated experience in networking computers and terminals over a large geographic region. Specifically, we are interested in RSX-11, RMS-11, DECNET and large disk file experience.

Benefits include a unique health care plan and dental insurance. For immediate consideration, please send a resume to Bob Ross, Microform Data Systems, 830 Maude Avenue, Mt. View, CA 94043. An Equal Opportunity Employer M/F.

MICROFORM
DATA SYSTEMS

Finding the best is what we do best.

Our staff is expert at finding "the best person for the job." Most of our placement managers are C.P.A.'s, C.A.'s, controllers or systems managers, the largest most experienced financial, banking and data processing service in the world.

We have expanded to 50 offices throughout the United States, Canada and also Great Britain.

We believe the combined talent and skill of Robert Half employees made us what we are today.

Maybe we're just what you're looking for.

World's Largest Financial & EDP Personnel Specialists.

ROBERT HALF
PERSONNEL AGENCIES

Call us.
We're in the White Pages
in key areas throughout the
United States,
Canada and Great Britain.

SYSTEMS ANALYST

San Diego based manufacturer has immediate need for Systems Analyst. 3-5 years business systems experience and full understanding of COBOL programming. Extensive application experience in order entry, inventory control, physical distribution, accounts receivable, credit management, and production control. On-line data base management systems and development and good documentation skills. Formal college education/degree desirable. Submit resume and salary history, in confidence, to:

CW Box 5026
797 Washington St.
Newton, Mass. 02160
Equal Opportunity Employer M/F

EDP POSITIONS

Harris Computer Systems Division, due to rapid expansion, has engineering and marketing positions available in its Ft. Lauderdale location.

MARKETING PROGRAM COORDINATOR

Two positions for domestic and international marketing program coordination. The individuals we seek must be degreed in either marketing or computer science.

The successful candidate will be responsible for:

- Interfacing with customer and field sales personnel
- Computer systems configuration
- Follow-through from receipt of order, acceptance testing and installation
- Interface with operations, contracts and other key departments in the program cycle.

DIAGNOSTIC ENGINEERS

Immediate openings for Diagnostic Engineers who have digital hardware and diagnostic software experience and possess in-depth knowledge of software design/implementation, digital fault isolation and detection procedures.

The above positions offer excellent compensation and benefits package, in addition to challenging work in a dynamic environment.

Please forward a detailed resume, including salary history, to W.D. Taylor, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Fla. 33309.

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

Information Systems Programmers

Here is some important DATA for exciting opportunities on the SAN FRANCISCO PENINSULA!

If you're ready to advance your talents and expand your experience in a truly professional atmosphere, then investigate these key opportunities awaiting you now.

Data Base Administrators

Our Central Data Base Administration requires data processing professionals with heavy IMS/VS experience. The successful candidates will be working in a highly sophisticated 370/168 MVS environment, employing the latest in data base management techniques.

Sr. Systems Programmer

Responsible for coordination of program development of large scale information retrieval system, including all hardware and software requirements for data communications, software development, computer operations, and file generation and maintenance. Requires advanced degree and 10-15 years' experience in systems level programming and computer science with strong emphasis in OS/MVT and other IBM 360/370 systems including HASP, CICS, RPG, WILBUR, etc. You should have demonstrated ability to coordinate and direct activities of programmers, systems and operation personnel? and full knowledge of telecommunications processes.

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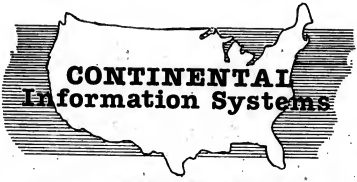

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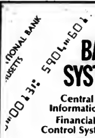

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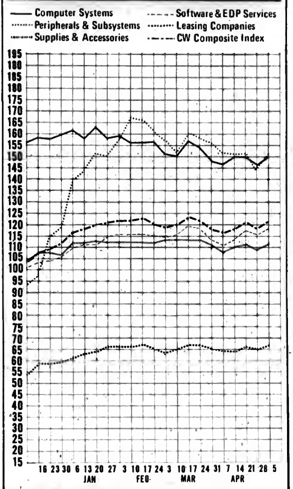

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 4, 1977

All statistics compiled, computed and formatted by
TRADE★QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1976-77 RANGE (1)	CLOSE MAY 4 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	AMDAHL CORP	23- 40	26	- 1/4	-0.9
N	BURROUGHS CORP	55-108	58 1/2	+2 1/8	+5.7
O	COMPUTER AUTOMATION	10- 25	23 1/8	+ 1/2	+2.2
N	CONTROL DATA CORP	18- 27	21 3/8	+ 3/4	+5.6
N	DATA GENERAL CORP	55- 60	57 5/8	+ 1/8	+0.5
O	DATAPOINT CORP	18- 46	21	+1 3/4	+9.0
N	DIGITAL EQUIPMENT	37- 60	59 1/4	- 1/8	-0.3
N	ELECTRONIC ASSOC.	2- 5	2	0	0.0
A	ELECTRONIC ENGINEER.	7- 16	8 1/8	+ 1/4	+3.1
O	FOUR-PHASE SYSTEMS	15- 21	14 7/8	+ 5/8	+4.5
N	FOXBORO	28- 53	53 1/8	+2 7/8	+5.7
O	GENERAL AUTOMATION	4- 11	6 5/8	- 1/8	-1.8
C	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	69-117	72 5/8	+3 3/8	+4.8
N	HONEYWELL INC.	34- 56	51 1/4	+1 1/2	+3.0
N	IBM	227-288	262 7/8	+1 5/8	+0.6
C	MANAGEMENT ASSIST	1- 9	6	+ 1/4	+4.3
O	MEMOREX	17- 33	25 5/8	+ 5/8	+2.5
O	MICRODATA CORP	7- 28	7 7/8	- 1/8	-1.3
O	MODULAR COMPUTER SYS	3- 14	7 1/8	+ 1/8	+1.7
N	NCR	24- 38	34 5/8	+1 1/8	+5.3
C	PRIME COMPUTER INC	4- 18	15 1/2	+ 1/2	+5.8
N	PERKIN-ELMER	17- 27	17	+ 1/8	+0.7
N	RAYTHEON CO	45- 67	63 5/8	+2 1/2	+4.0
N	SPERRY RAND	34- 52	37 1/8	+5 1/8	+9.1
C	SYCOR INC	8- 31	9 3/4	+1 1/8	+13.0
A	SYSTEMS ENG. LABS	5- 10	6 3/8	+ 5/8	+6.2
N	VARIAN ASSOCIATES	12- 20	19	+ 1/4	+1.5
A	WANG LABS.	11- 20	15 1/2	+ 1/4	+1.6

LEASING COMPANIES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE MAY 4 1977	WEEK NET CHNGE	WEEK PCT CHNGE
C	BOOTHE COURIER CORP	1- 10	9 1/8	+ 1/8	+1.3
C	COMDISCO INC	3- 15	10 5/4	+ 1/2	+4.8
A	COMMERCE GROUP CORP	2- 3	1 7/8	- 1/8	-6.2
A	COMPUTER INVSTRS GRP	1- 5	1 1/4	+ 1/8	+11.1
M	DATRONIC RENTAL	1- 8	1	0	0.0
A	DCL INC	1- 2	1 1/4	0	0.0
A	DPF INC	5- 8	6 3/8	0	0.0
N	ITEL	4- 16	14 1/4	+ 7/8	+6.5
N	LEASCO CORP	4- 24	23 1/2	+1 1/2	+4.8
C	LEASPAC CORP	0- 1	1/2	0	0.0
C	NRG INC	0- 1	1/4	+	+52.9
A	PIONEER TEX CORP	6- 11	8	- 1/8	-1.5
N	U.S. LEASING	7- 12	11 3/8	+ 5/8	+3.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; P=PIONEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE MAY 4 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 3	1 1/8	+ 1/8	+12.5
O	ANACOMP INC	6- 11	9	+ 1/4	+2.8
A	APPLIED DATA RES.	2- 7	6 1/4	+ 3/4	+13.6
N	AUTOMATIC DATA PROC	17- 35	25	+1 5/8	+6.9
O	COLEMAN AMERICAN COS	2- 6	1 7/8	0	0.0
C	COMPU-SERV NETWORK	3- 15	11 1/2	+ 1/2	+4.5
O	COMP ELECTION SYSTMS	5- 9	8 5/8	- 1/8	-1.4
O	COMPUTER HORIZONS	1- 2	1 1/4	0	0.0
C	COMPUTER NETWORK	2- 8	5 3/4	- 1/8	-2.1
N	COMPUTER SCIENCES	4- 9	7 1/4	0	0.0
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	2- 6	2	0	0.0
O	COMSHARE	2- 9	5 1/2	+ 1/2	+10.0
O	DATA DIMENSIONS INC	2- 5	4	0	0.0
O	DATATAB	1- 2	2 1/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 19	16 5/4	+ 5/4	+4.6
C	INSYTE CORP	1- 3	1 5/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	5/4	0	0.0
O	KEANE ASSOCIATES	2- 4	5 7/8	+ 1/8	+3.5
O	KEYDATA CORP	1- 5	2	- 1/8	-5.8
A	LOGICON	5- 16	14 5/8	+ 5/8	+4.4
A	MANAGEMENT DATA	1- 5	1 1/4	0	0.0
A	NATIONAL CSS INC	13- 25	19 3/8	- 5/8	-3.1
O	NATIONAL DATA COMM	4- 7	4 5/4	0	0.0
A	ON LINE SYSTEMS INC	17- 25	17 5/4	- 1/8	-0.6
N	PLANNING RESEARCH	3- 5	5 5/8	0	0.0
C	PROGRAMMING & SYS	1- 1	5/4	- 1/8	-14.2
O	RAPIDATA INC	2- 3	2 1/8	+ 1/8	+6.2
O	REYNOLDS & REYNOLDS	15- 21	16 1/2	- 5/4	-4.5
O	SCIENTIFIC COMPUTERS	1- 2	2 5/8	+ 1/2	+25.5
O	TYMSHARE INC	14- 28	16 1/4	- 1/4	-1.5
A	URS SYSTEMS	3- 5	4 3/4	+ 5/8	+15.1
N	WYLY CORP	1- 7	1 1/2	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1976-77 RANGE (1)	CLOSE MAY 4 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 14	11 1/8	+1	+9.8
O	ADVANCED MEMORY SYS	4- 10	7 7/8	+ 5/8	+8.6
N	AMPEX CORP	5- 10	7 3/4	0	0.0
O	ANDERSON JACOBSON	2- 4	3 1/2	0	0.0
N	APPLIED DIG DATA SYS	10- 25	11 1/8	+ 1/8	+1.1
O	BEEHIVE INT'L	3- 12	9 5/4	- 1/4	-2.5
A	BOLT,BERANEK & NEW	7- 11	6 7/8	0	0.0
N	BUNKER-RAMO	5- 12	10	- 1/8	-1.2
A	CALCOMP	5- 7	2 7/8	0	0.0
O	CAMBRIDGE MEMORIES	0- 6	1	+ 1/4	+35.3
N	CENTRONICS DATA COMP	20- 34	22	- 5/4	-5.2
O	CODEX CORP	22- 47	46	+4 1/4	+10.1
C	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 6	5 1/8	+ 1/2	+10.8
O	COMPUTER CONSOLES	4- 7	3 1/4	+ 1/4	+5.0
A	COMPUTER EQUIPMENT	1- 3	5 1/8	+ 3/8	+13.6
C	COMPUTER TRANSCEIVER	1- 3	1 1/8	0	0.0
O	CONTEN	4- 15	11 5/8	+ 3/8	+3.3
N	CONRAC CORP	20- 27	24 3/4	+ 5/8	+2.3
O	DATA ACCESS SYSTEMS	1- 5	4 3/4	- 1/4	-3.0
O	DATA 100	6- 13	7 1/8	+ 1/8	+1.7
A	DATA PRODUCTS CORP	5- 15	10 1/4	+ 5/4	+7.8
O	DATA TECHNOLOGY	1- 4	3 5/8	0	0.0
C	DATUM INC	1- 2	1 1/2	0	0.0
O	DECISION DATA COMPUT	1- 4	1 3/4	+ 1/8	+7.6
O	DELTA DATA SYSTEMS	1- 1	5/8	0	0.0
N	ELECTRONIC M & M	1- 5	4 1/4	0	0.0
O	FABRI-TEK	1- 2	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	0- 2	1	+ 1/4	+53.5
N	HAZELTINE CORP	4- 12	9	+ 3/8	+4.3
N	HARRIS CORP	27- 59	38 5/4	+2 1/4	+6.1
A	INCOTERM CORP	9- 20	12	- 1/4	-2.0
C	INFOREX INC	3- 7	4 7/8	- 1/8	-2.5
O	INFORMATION INTL INC	10- 18	11 3/8	- 1/8	-1.0
O	INTEL CORP	38-109	43 1/2	+2 1/2	+6.0
A	LUNDY ELECTRONICS	5- 7	4 1/8	- 7/8	-17.5
O	MSI DATA CORP	3- 8	7 5/4	+ 1/4	+5.5
N	MOHAWK DATA SCI	3- 10	5 1/8	- 1/4	-4.6
O	PENRIL CORP	1- 4	4 1/2	- 1/4	-5.2
A	PERTEC CORP	3- 9	6 7/8	0	0.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	1 1/2	- 1/2	-25.0
O	QUANTOR CORP	4- 6	4 5/8	0	0.0
O	RECOGNITION EQUIP	6- 11	7 1/4	+ 1/8	+1.7
O	SCAN DATA	1- 4	1 5/8	0	0.0
O	STORAGE TECHNOLOGY	9- 13	10	- 1/4	-2.4
O	T BAR INC	5- 10	9 1/4	+ 1/4	+2.7
O	TALLY CORP.	4- 6	4 3/4	+ 3/8	+8.3
O	TEC INC	3- 9	8	+ 1/4	+3.2
N	TEKTRONIX INC	45- 69	59 1/4	+1	+1.7
N	TELEX	2- 5	2 3/8	+ 1/4	+10.5
O	WILTEK INC	1- 2	1/4	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1976-77 RANGE (1)	CLOSE MAY 4 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	2- 3	2 1/4	0	0.0
A	BARRY WRIGHT	4- 13	13	+ 7/8	+7.2
O	CYBERMATICS INC	0- 1	1/2	0	0.0
O	DUPLEX PRODUCTS INC	15- 24	16 1/4	+ 3/4	+4.8
N	ENNIS BUS. FORMS	4- 8	5 7/8	- 1/8	-2.0
O	GRAHAM MAGNETICS	8- 14	11 1/4	- 1/2	-4.2
O	GRAPHIC CONTROLS	13- 19	14 1/2	+ 3/4	+4.7
N	3M COMPANY	48- 46	50 1/8	+1 5/8	+3.3
O	MOORE CORP LTD.	50- 51	30 3/4	+ 1/4	+0.8
N	NASHUA CORP	11- 20	18	+ 7/8	+5.1
O	STANDARD REGISTER	15- 22	21 1/4	+ 1/4	+1.1
O	TAB PRODUCTS CO	5- 17	16	0	0.0
N	UARCO	19- 25	20 1/4	+ 1/4	+1.2
A	WABASH MAGNETICS	4- 14	12 5/8	+ 1/8	+1.0
N	WALLACE BUS FORMS	17- 25	17 3/4	+ 1/8	+0.7

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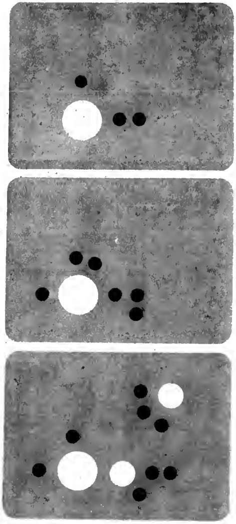

Incremental pricing for small networks.

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There's no need to compromise any longer. TASK/MASTER now comes with incremental pricing. The smaller your network, the less you pay. Any on-line system, even one with just a few terminals, can enjoy the full benefits of TASK/MASTER right from the start.

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